ENGINEERING NEWS-RECORD

NOV. 14, 1957

PRICE 50 CENTS

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Putting power underground in Quebec p. 52

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Workmen ready 60" O.D. wrought iron intake lines for rugged cross-country service

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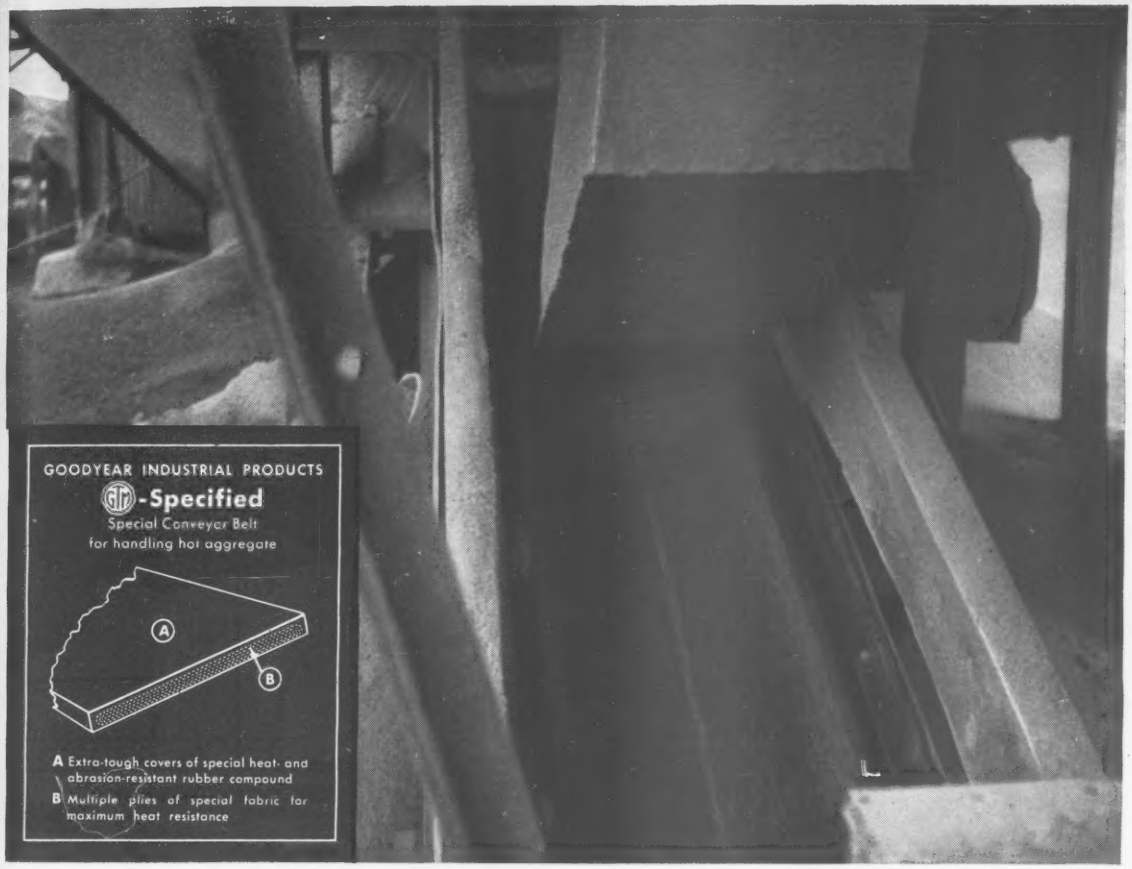
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G.T.M.-Specified
Special Conveyor Belt
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B
A Extra-tough covers of special heat- and abrasion-resistant rubber compound
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Saved over $4,000 on hot-and-heavy job

A heavy flow of aggregate for asphalt mix—delivered at a smoking 450° F.—quickly beat and burned the life out of all previous belts used at this upper New York State batch plant. The longest service was a scant 3 months. And their former belt supplier advised that this was tops under the rugged conditions.

But that was before the G.T.M.—Goodyear Technical Man—made his recommendation: a special belt muscled with multiple plies of special fabric and armored with heat- and abrasion-resistant covers. *Installed, the G.T.M.'s belt put in 37 months of service—saved over $4,000 in belt replacement and maintenance costs alone.*

Eye-opening savings like this are always possible when the G.T.M. tackles a job. He's your man no matter what your industrial rubber problem. Contact him through your Goodyear Distributor—or by writing Goodyear, Industrial Products Division, Akron 16, Ohio.

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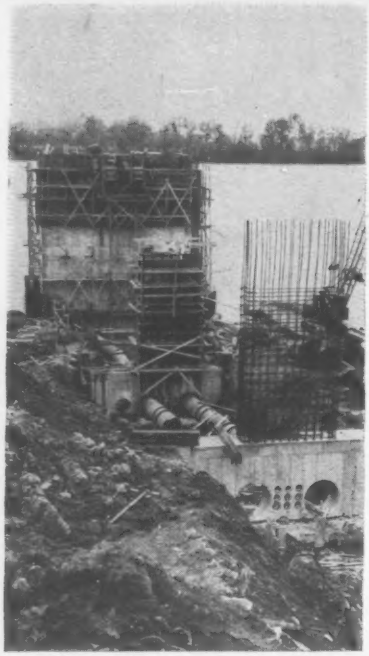


Symons Forms used on Ohio River Intake Job . . .

60,000 square feet of concrete forming went into this job constructed for the city of Henderson, Kentucky. The wall started at elevation 317 (sea level elevation) or 21 feet below the river pool stage and when completed was topped at 385 or 47 feet above the water.

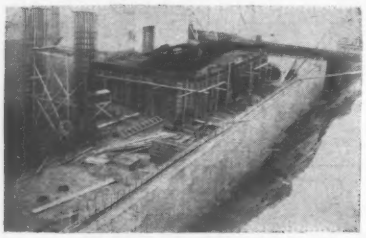
15,000 square feet of Standard Symons Wood Frame Forms were used, in sizes 2′ x 4′, 2′ x 6′ and 2′ x 8′.

George Ryan, Vice President said, "Even in the eight foot lengths our Symons Forms are easily carried by one man. Another feature which we have found helpful is the ease of removing a panel at any place in a wall to clean keyways and straighten reinforcing steel. This has saved us a lot of time."

Three piers for an all access bridge to the intake structure were also formed with Symons Forms. Part of the project involved an extension of the Henderson power plant.

Symons Forms can be rented with purchase option, all rentals to apply on purchase price. Symons Clamp & Mfg. Co., 4265 Diversey Avenue, Dept. L-7, Chicago 39, Illinois.

Roy Ryan Sons Company, Inc., Evansville, Indiana
General Contractor



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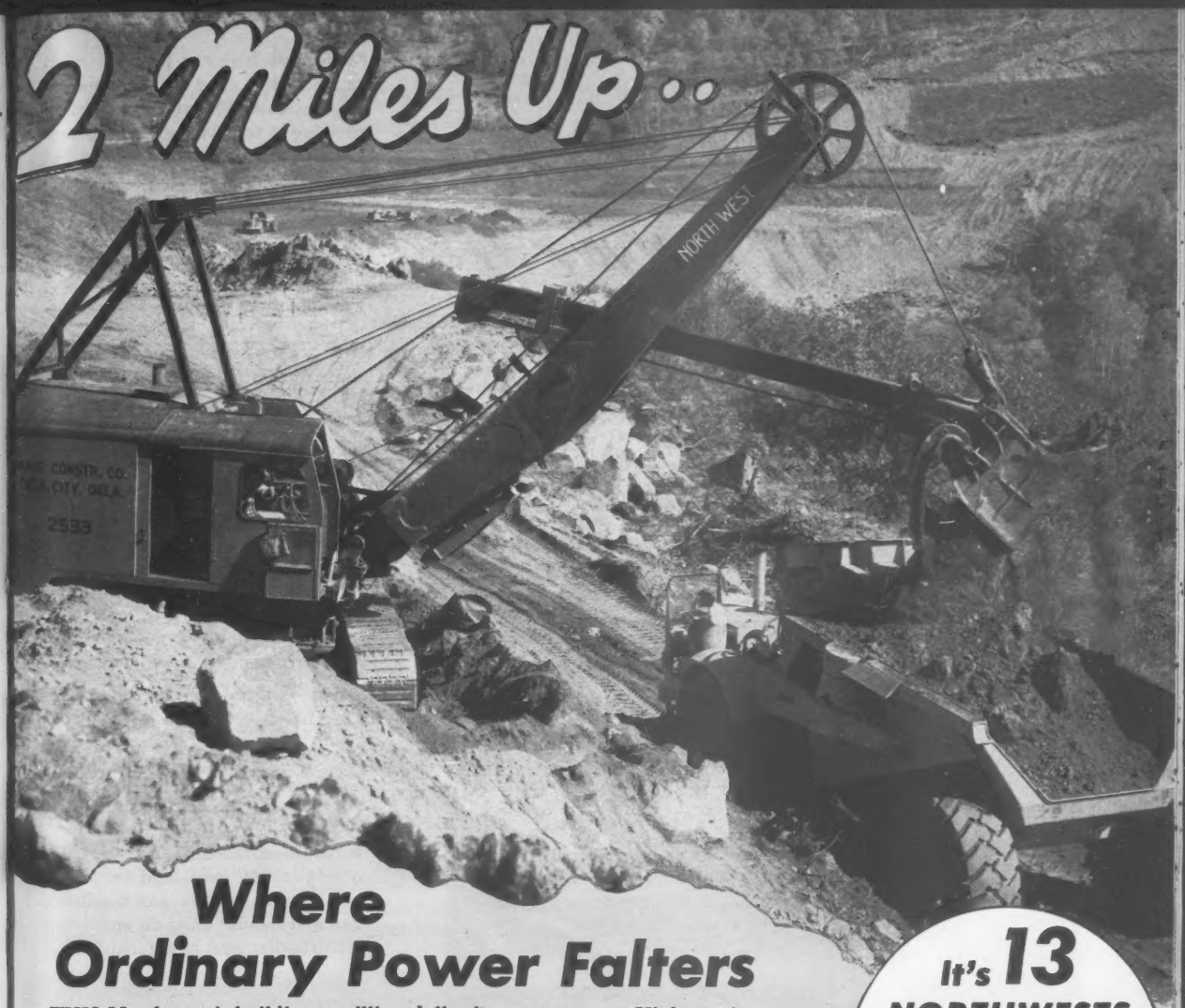

Where Ordinary Power Falters

THIS Northwest is building a million dollar improvement on Highway 40 east of Steamboat Springs, Colorado, high in Rabbit Ears Pass. The contractor is Amis Construction Co. of Oklahoma City, Oklahoma, and the Northwest is one of two 80-D, 2½-yd. shovels they have on the job. This is one of 13 Northwests this well known southwestern contractor has bought over the years.

This Northwest is working almost 2 miles up in a mixed mess of earth and rock. Smooth operation on jobs like this tell the story of a properly engineered power plant for altitude plus the Northwest Dual Independent Crowd that utilizes force most other independent crowd shovels waste entirely. Here is a combination that only Northwest can give you, a combination that assures a profitable answer to both the problems of mountain work or work at normal altitudes. It is just another of the many advantages that have built the Northwest reputation for *always being ready to go.*

If you want to get the job done—if you want steady day in, day out operation, and be ready for all the problems that a job presents, a Northwest is the answer. These are the things that make one out of every three Northwests sold a repeat order in the hands of successful contractors like Amis Construction Co. No one ever lost money by buying the best in machinery.

It's 13 NORTHWESTS for AMIS Construction Co. Oklahoma City Oklahoma

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Are engineering manpower shortages delaying highway construction progress in your work area?

Eastshore Freeway, Alameda County, California

The new highway program is off to a slow start for a number of reasons. One of them is the essential time lag in translating highway programs and surveys, into detailed highway construction plans and staked right-of-way.

Here are some suggestions for modern mechanization to save manpower and speed-up engineering, as made by Robley Winfrey, Chief, Personnel and Training, Bureau of Public Roads. The list is quoted as published in the Highway Program Newsletter:

- Aerial surveying and photogrammetry as aids to location, map making, and design.
- Electronic and other types of business machines for making all types of arithmetical calculations and arrangements of data.
- The self-leveling level and other recently developed types of surveying instruments.
- Standard plans and standard portions of plans.
- Photographic processes of printing plans to save both time and expense over the time-honored blueprinting process.
- Radio communication between headquarters and field personnel, and between field-project headquarters and mobile units on surveying, construction, and maintenance.
- Longer mileage projects under one contract.
- Design tables to save calculation time.

Perhaps you can further some of these time-savers. If you have other practical ideas for speeding up the progress of the road program, write us with your suggestions. We'll be glad to give all suggestions received careful consideration and see that they are suitably compiled and summarized. They will then be submitted to the Bureau of Public Roads for possible action through their departments. They will also be published in our national advertising as of general interest to the highway industry. Address your letters to Merle Yontz, President.

1679-DC-1

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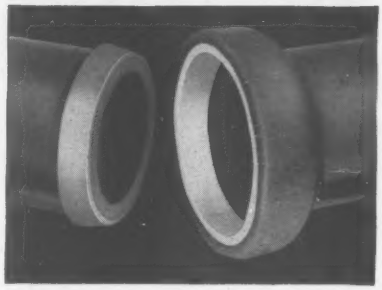


More than 200 major installations have been completed with outstanding results since Amvit Jointed Clay Pipe was introduced in 1955.

Such pioneer cities as Ann Arbor, Michigan, Dayton, Ohio, Camden, New Jersey have installed their second and third Amvit sanitary lines.

A mechanical joint designed for quick, low-cost installation, Amvit* will give you lower cost-in-place. Here's how:

1. QUICK INSTALLATION SAVES LABOR

No other materials such as caulking, joint compound, hot pots, or ladles are needed to make the Amvit joint. The joint is on the pipe delivered to the job ready for use. Just push the pipe together and the joint is complete.

2. IMMEDIATE BACKFILLING

You can backfill as soon as the line is completed. Barricades can be removed and streets opened days sooner.

3. QUICK TESTING

No need to wait days to see if a line has passed test. A look at the completed joint will tell. Thus, engineers can inspect and accept the line allowing the contractor to receive payment quicker.

4. CONTROLS INFILTRATION

Field tests from completed installations show that infiltration can be definitely controlled. Engineers can, thus, reduce infiltration specifications, use smaller diameter pipe and save in material cost.

5. ROOT PROOF

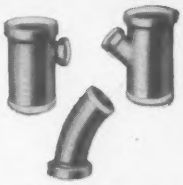
Amvit is a compression joint on the ball and socket principle. The surfaces of both bell and spigot are in uniform compression preventing root penetration.

6. BETTER FLOW, LESS MAINTENANCE

The design of the joint assures that the pipe is self-centered at all times. This gives perfect alignment and self-cleansing. Because the joint is really tight, no foreign matter such as dirt, sand and stones can possibly enter the line.

7. COMPLETE FITTINGS

Amvit is furnished on all standard fittings, as well as pipe. This will permit a uniformly tight line from house wall to treatment plant.



Amvit Jointed Clay Pipe, in sizes 4" through 24" together with all fittings is available for immediate delivery in the Northeast and Central States.

For more information on how Amvit can help cut your sewer project costs, write or call American Vitrified Products Company, National City Bank Building, Cleveland, Ohio, or our office nearest you.

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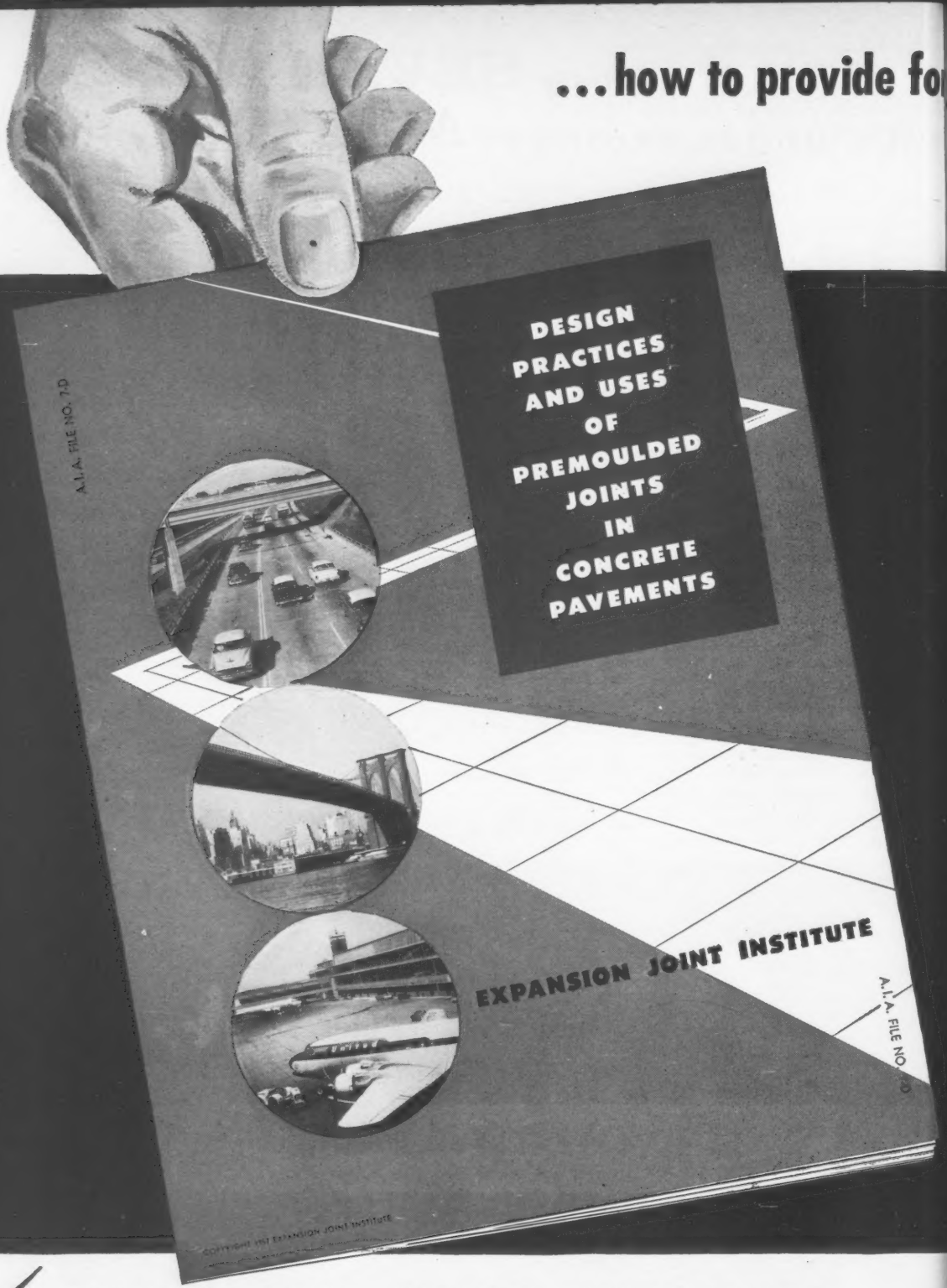

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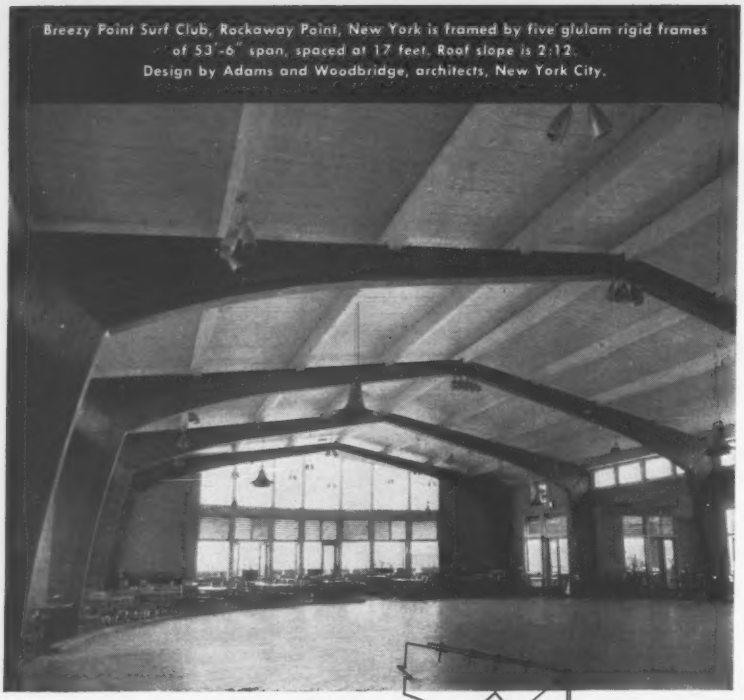

Breezy Point Surf Club, Rockaway Point, New York is framed by five glulam rigid frames of 53'-6" span, spaced at 17 feet. Roof slope is 2:12. Design by Adams and Woodbridge, architects, New York City.

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Reader Comment

On Engineering Fees

SIR: In ENR Aug. 29, p. 17, under the title, "High Engineering Costs," is a disturbing news account regarding allegedly excessive engineering fees for work at the Sky Harbor Airport in Phoenix. The trouble with the article is that most readers will be affected by the first part of the article and will pay little attention to the final sentence.

All firms in private practice are meeting the same increase in their operating costs that is reported for the Phoenix city engineering staff. Firms in private practice—and I am sure the firms out in Phoenix are no exception to the general rule—are finding it advisable and necessary to increase base pay schedules, to take on the costs of bonuses and many fringe benefits, and are confronted also with constantly increasing overhead expenses, particularly those pertaining to services engaged, such as the costs for blueprinting, soil borings, laboratory work, and the like.

Furthermore, your article is a bit unfair in that it does not point out what the 8% fee includes. For example, does the 8% fee include or exclude the cost of full time, daily supervision and inspection service? An article of the type mentioned herein can ordinarily do more damage than good.

ARTHUR WARDWELL CONSOER
Consulting Engineer
Chicago, Ill.

Kemer Dam in Turkey

SIR—I read with much satisfaction Mr. Bowman's article on the progress in hydroelectric development in Turkey (ENR, Oct. 10, p. 34) as I was associated with the consulting engineers on the feasibility studies in the Gediz and Menderes Valleys beginning in 1949.

The Kemer Dam is not on the main Menderes River as stated in the text of the article but is on a tributary, the Ak Cayi, which has a drainage area of only 1,200 sq mi at the dam site compared with a total area of 7,070 sq mi for the main river at the mouth of the Ak Cayi. The Kemer project is important because the river upstream from

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

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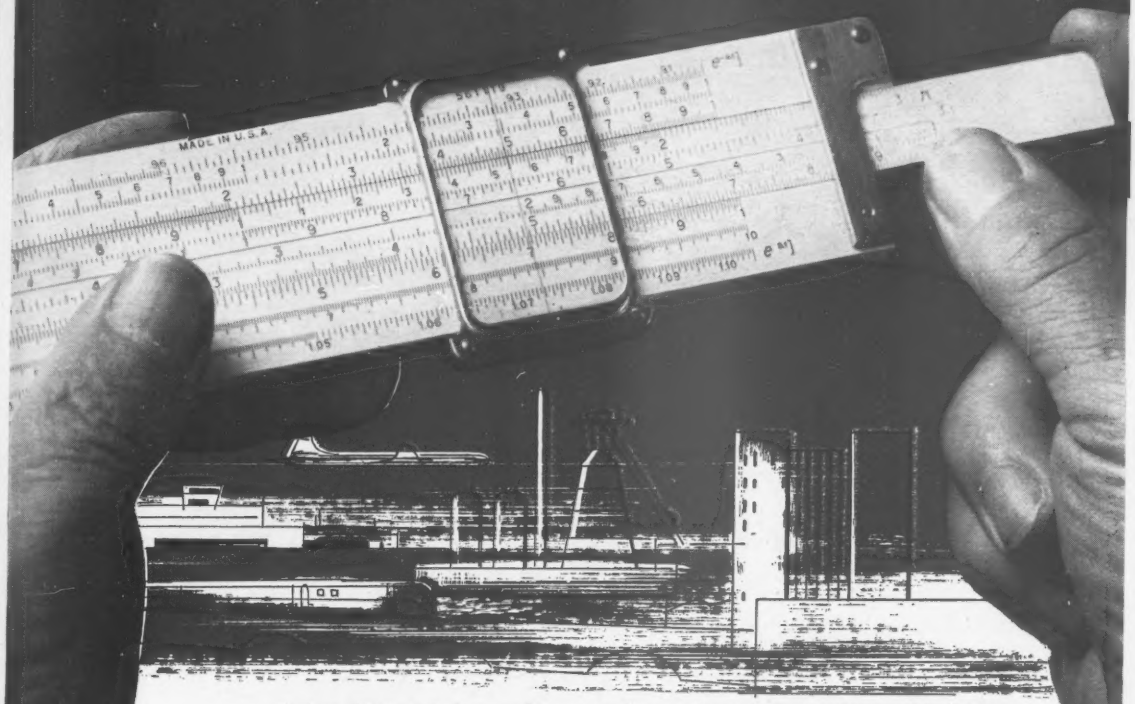

Vulcan Materials is proud to serve the engineers, contractors and builders whose knowledge, vision and performance are building an ever-greater nation and expanding economy.

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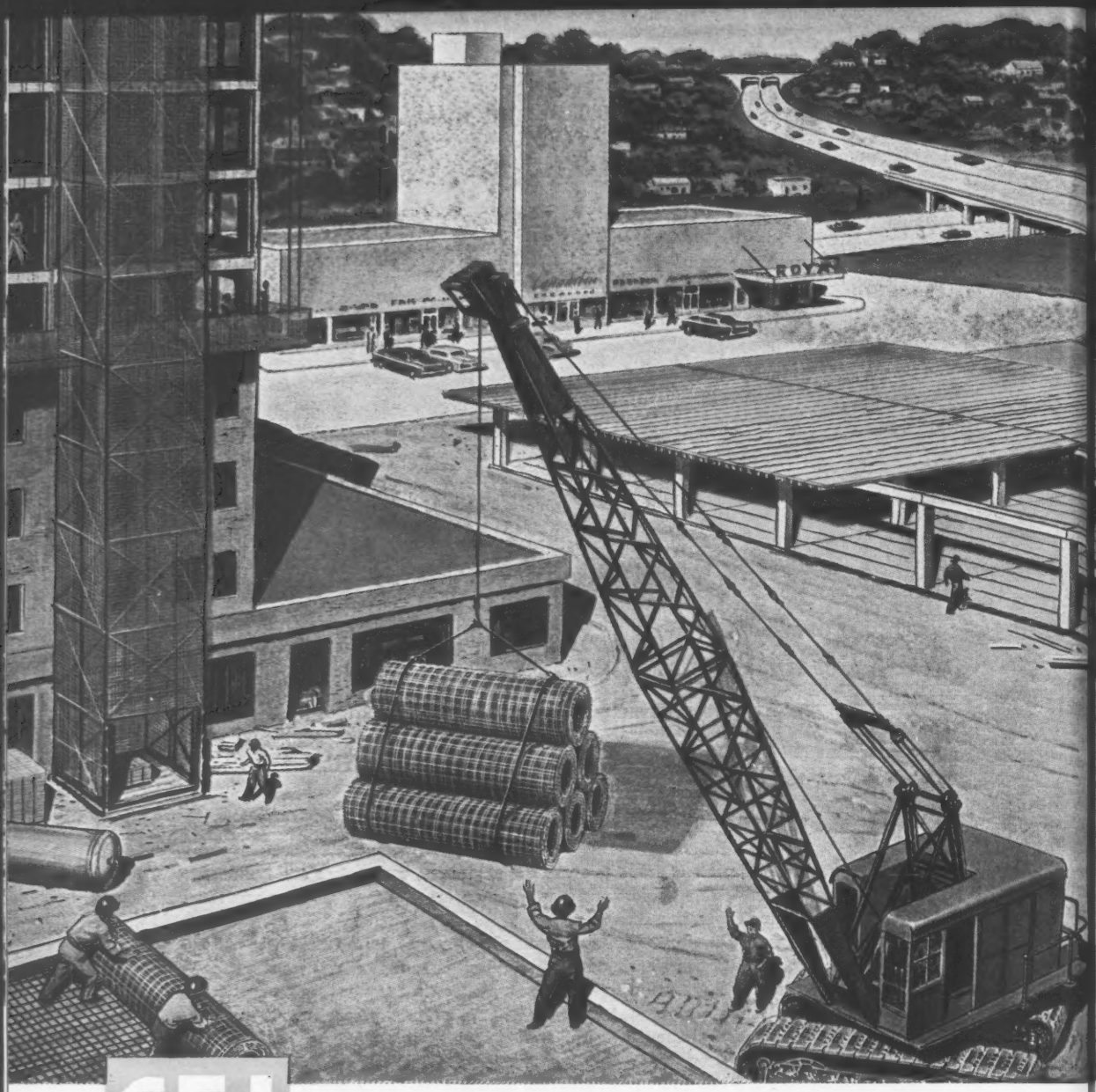

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A seemingly endless variety of equipment and materials flow into the construction site for a modern suburban development project. Many of these are made of steel—from structural members to fabricated components...from materials handling to construction equipment. The logistics problem is a complicated one for all the contractors involved.

That's why many contractors... and other big steel users... are turning to CF&I as a single source for many of their steel requirements. CF&I manufactures a complete range of steel products—those shown here and many more. And steel buyers know they can count on quick delivery when they order from this completely integrated producer...know they can count on the top quality that has long been a CF&I trademark.

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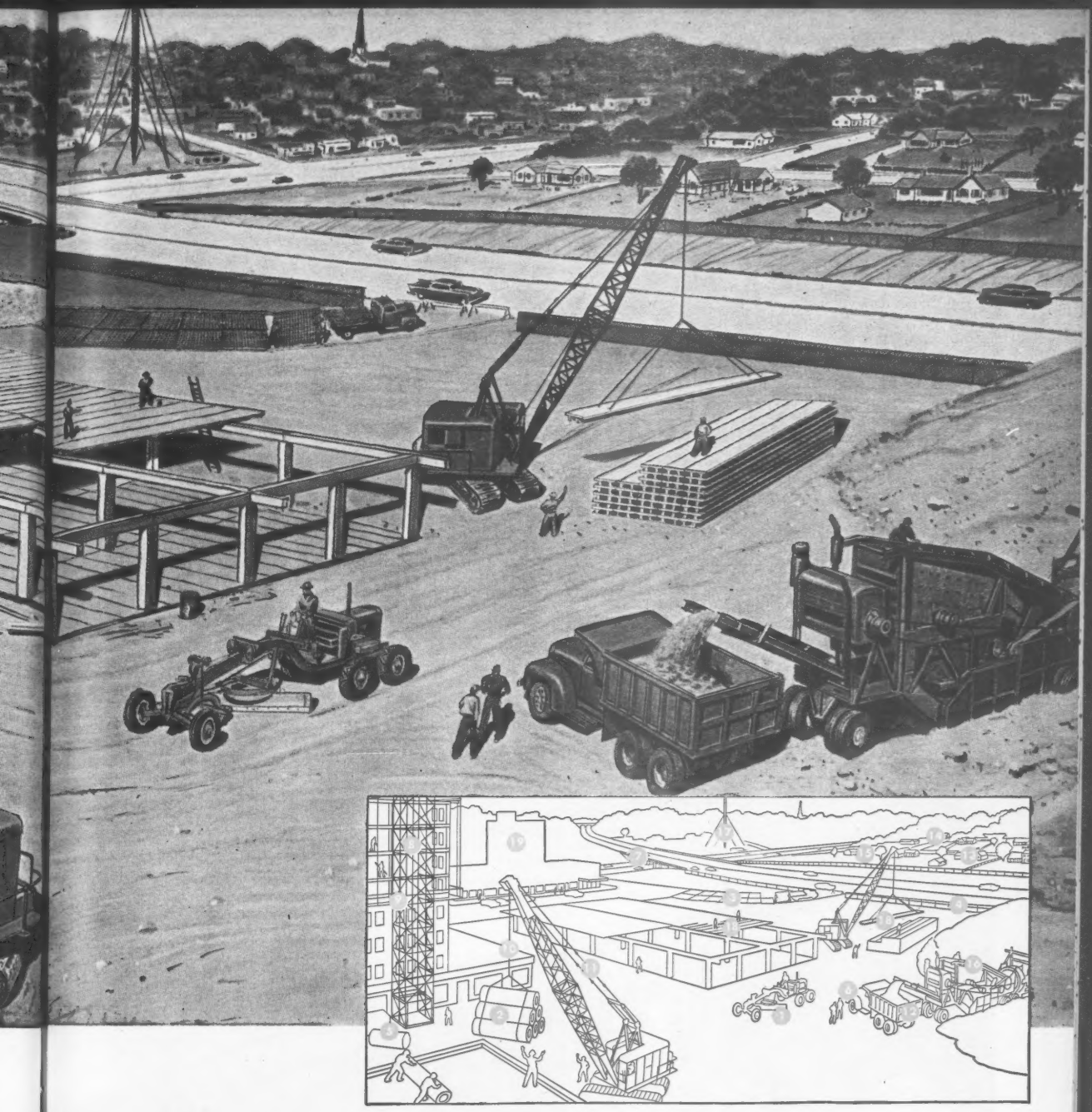

in suburban development

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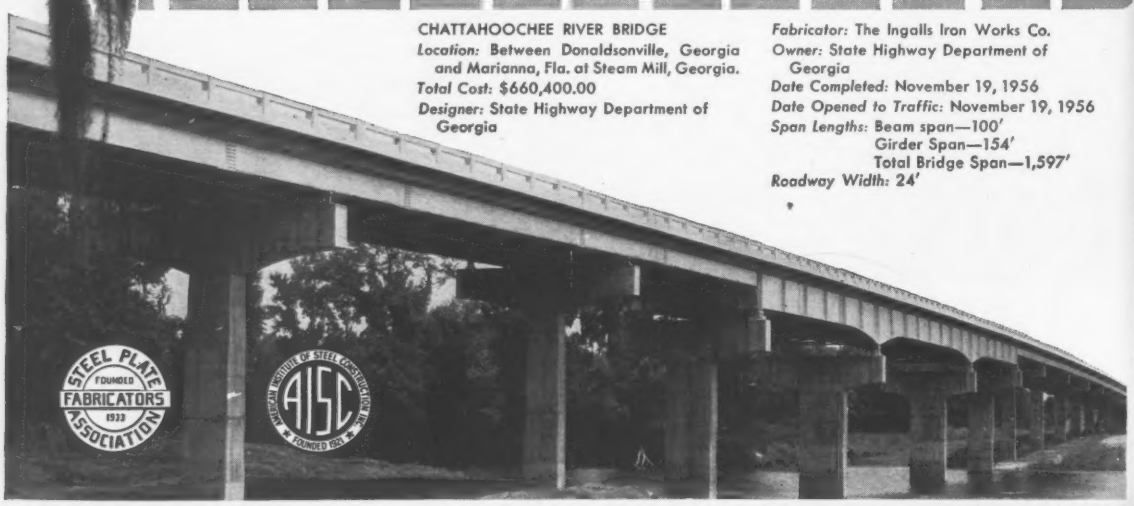
This Chattahoochee River Bridge, designed by the State Highway Department of Georgia, is an example of the beauty, strength and economy of modern construction. Steel for this 1,597-foot bridge was fabricated by The Ingalls Iron Works Company.

In bridges, modern office or industrial buildings . . . wherever structural design calls for functional beauty plus high strength and permanent economy . . . fabricated structural steel is the logical choice.

Ingalls' 47 years of structural steel experience . . . both in fabrication and erection . . . have helped make it one of the country's major fabricators of structural steel.



CHATTAHOOCHEE RIVER BRIDGE
Location: Between Donaldsonville, Georgia and Marianna, Fla. at Steam Mill, Georgia.
Total Cost: $660,400.00
Designer: State Highway Department of Georgia
Fabricator: The Ingalls Iron Works Co.
Owner: State Highway Department of Georgia
Date Completed: November 19, 1956
Date Opened to Traffic: November 19, 1956
Span Lengths: Beam span—100'
Girder Span—154'
Total Bridge Span—1,597'
Roadway Width: 24'

The Ingalls Iron Works Company
Sales Offices: New York, Pittsburgh, Chicago, Houston, New Orleans, Atlanta

Birmingham Tank Company
Sales Offices: New York, Pittsburgh, Chicago, Atlanta, New Orleans, Pascagoula

The Ingalls Steel Construction Company
Sales Offices: New York, Chicago, New Orleans, Pittsburgh, Houston, Atlanta

The Ingalls Shipbuilding Corporation
Shipyards: Pascagoula, Mississippi; Decatur, Alabama
Sales Offices: New York, Chicago, Philadelphia, Washington, Houston, New Orleans, Atlanta

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LAMSON High-Strength Bolts and Nuts

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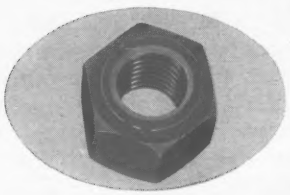
2 LOOK FOR THE NUBS ON THE WASHERS

The nubs on the washers show that they have met the specifications laid down by ASTM.

Look for the three nubs on the perimeter of the washers you buy . . . and be *sure* of ASTM quality.

3 LOOK FOR THE ARCS ON THE NUT



The three long indented arcs on each end of the nut indicate that it meets with the latest ASTM specifications.

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dam site drains a mountainous region which has the highest rainfall in southwestern Turkey. The greatest annual rainfall in the headwaters is 51 in. while about half of the Menderes Basin receives only 12 to 24 in.

Although it regulates only 17% of the drainage area of the main river, the Kemer Dam, because of its strategic hydrologic position, will be effective in controlling floods in the important lower valley areas and in providing greatly needed irrigation water.

GORDON R. WILLIAMS
Professor of
Hydraulic Engineering
Massachusetts Institute of Technology
Cambridge, Mass.

A President Misplaced

SIR—In your article, "Unions for Engineers" (ENR Oct. 10, p. 81), you list Mr. Stanley Nelson as head of the Engineers and Scientists of California. Flattered as we might be to have Mr. Nelson, we are more than satisfied with our own President, Mr. Horace B. Weller. Our organization, Engineers and Scientists of California, represents as you stated, employees of the Pacific Gas and Electric Company; however, we also represent the employees of the Western Association of Engineers, Architects, and Surveyors and the employees of four Bay Area soil and foundation engineering firms represented by the Consulting Engineers Association of California.

Mr. Nelson is President of the Engineers and Architects Association located in Southern California, representing employees of Convair, Rheem, City of Los Angeles and others.

WILLIAM R. HOVEY,
Vice-President, Engineers and
Scientists of California
Oakland, Calif.

Correction

In the table Worldwide Construction Labor Rates (ENR Oct. 17, p. 145), wage rates for Lima, Peru, should be per eight-hour day instead of per hour.

CALENDAR

American Public Health Association, annual meeting, Cleveland, Ohio, Nov. 11-15.

American Standards Association, National Conference on Standards, St. Francis Hotel, San Francisco, Calif., Nov. 13-15.

Consulting Engineers Council, national board of director's meetings, Abraham Lincoln Hotel, Springfield, Ill., Nov. 15-17.

LONG SPAN M-DECKS

Mahon Long Span M-Deck in the Roof of the New Practice Session Field House, Ohio State University. Howard Dwight Smith, Architect, State of Ohio, Barber & Magee, Structural Engineers. Joseph Skilken & Co., General Contractors.

In Long Span M-Deck Sections You get the Roof Structure, the Roof Deck, and Acoustical Ceiling —All in One Package. Troffer Lighting can be included in Combined Roof-Ceiling.

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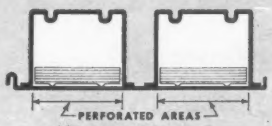
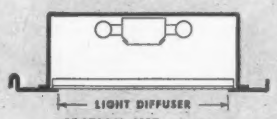
LONG SPAN M-DECK SECTIONS



SECTION M2SR (Acoustical)

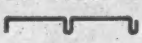


SECTION M1T (Troffer)

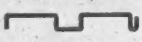
MAHON
LONG SPAN OPEN BEAM M-DECK

SECTION M1-OB

MAHON STEEL DECK



STANDARD DOUBLE RIB



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In M-Decks the architect and structural designers are given a versatile building product that permits them to design a simple roof in which the structural supporting members, the roof deck, the finished ceiling material, and the acoustical treatment can all be contained in one light weight, quickly erected unit. In schools, auditoriums, armories, sports arenas, field houses, churches or any type of building where wall to wall bearing is possible, or where rigid frame or exposed truss construction is employed, Mahon Cellular Steel M-Decks provide the structural roof and the finished ceiling material combined. Many arrangements are possible and many ceiling effects are obtainable. The long span structural M-Deck Sections span from wall to wall or from truss to truss. This eliminates roof beams and the cluttered effect of roof purlins, and produces a neat, continuous beamed or flat metal ceiling surface which is virtually indestructible. If recessed lighting is desired, Mahon Troffer Sections can be included in this type of roof-ceiling construction in any ratio to meet lighting requirements. Exposed metal surfaces of both M-Deck and Troffer Sections, which form the ceiling, can be readily painted to harmonize with any interior decor. Mahon cellular M-Deck Sections can be furnished with bottom metal perforated and fitted to provide a highly effective acoustical ceiling . . . Noise Reduction Coefficients range up to .85 in ceilings constructed with Mahon Sections of this type. Have a Mahon sales engineer call and bring you up to date on new Mahon Long Span Structural Sections now available for Roof, and Combined Roof-Ceiling Construction, or write for Catalogue LSD-58.

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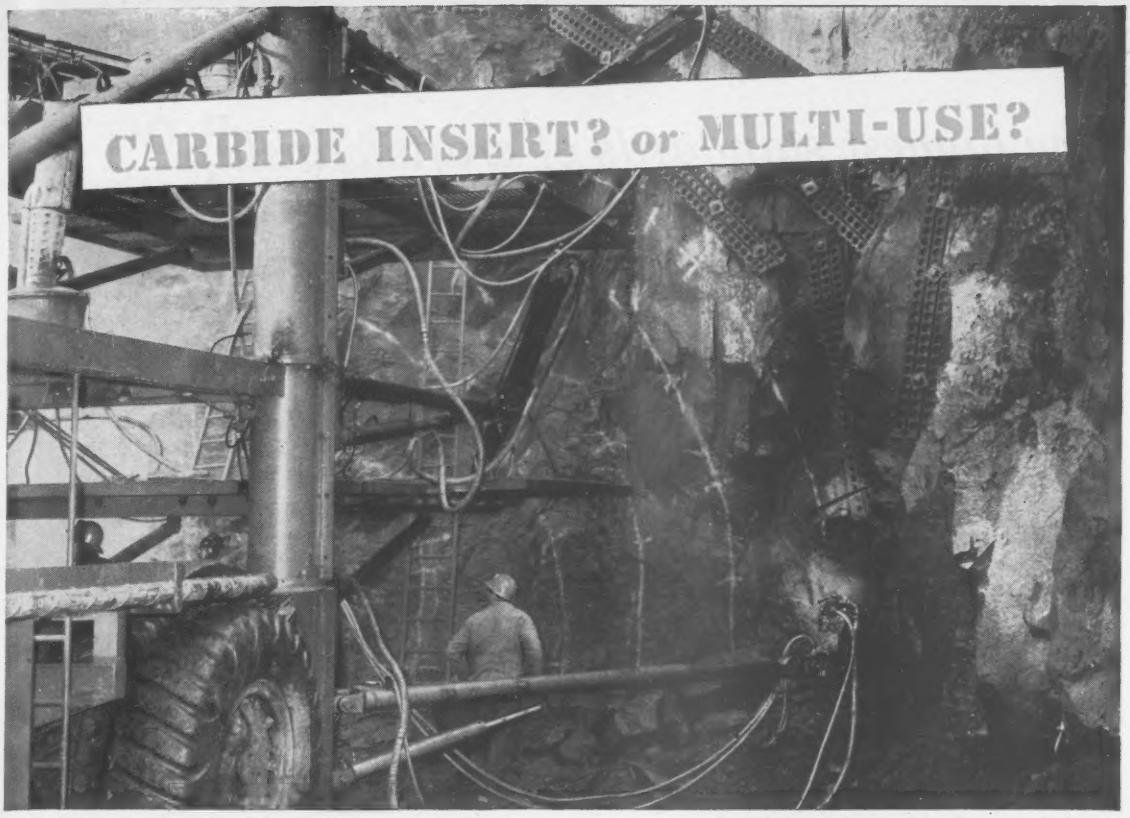

LOCATION: Mayfield Dam site, near Saukum, Washington. **OPERATING CONDITIONS:** Medium blocky basalt.

Increased drilling speed with TIMKEN® carbide insert bits saves time, labor on Mayfield Dam tunnel

DRILLING a diversion tunnel for the city of Tacoma's Mayfield Dam, Gibson and Roberts, rock drilling specialists of Yardley, Washington, had to chew through medium blocky basalt. For highest economy drilling through this hard ground, they used Timken® carbide insert rock bits with their jumbo drill rig.

Timken carbide insert rock bits permitted high speed drilling with fewest bit changes. With Timken bits the ground was drilled and blasted in one shift.

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To find out which type of Timken rock bit will do the best job for you write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable: "TIMROSCO".

Timken threaded multi-use rock bit

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your best bet for the best bit ...for every job

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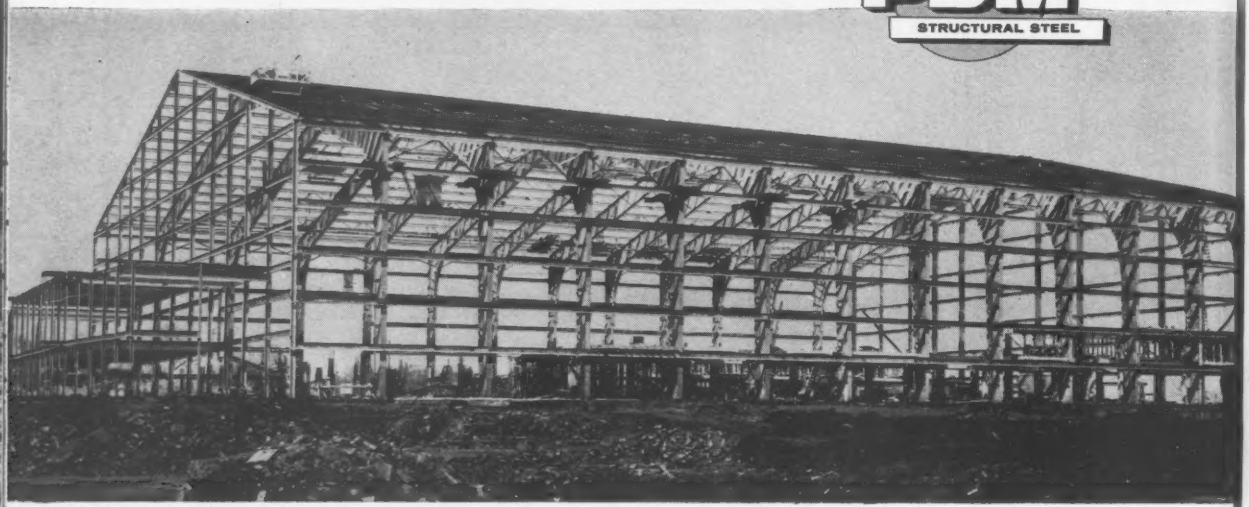
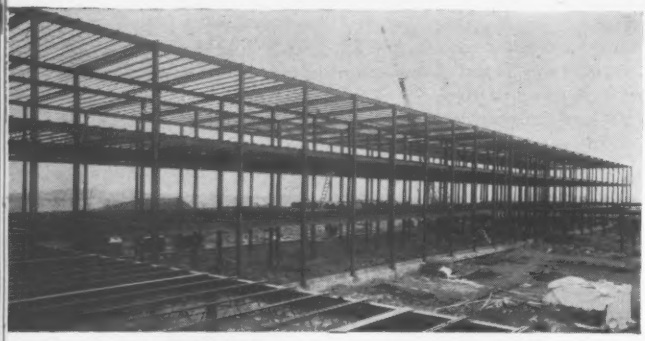
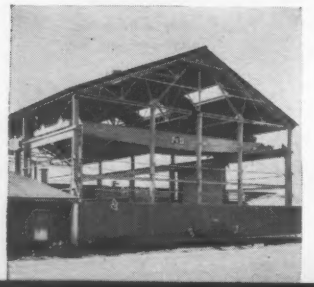


War Memorial Colosseum, Des Moines, Iowa. 2200 tons.



Penn Township High School,
Allegheny County, Pa.



Scrap Storage Building, Ambridge, Pa.

When the structural steel is erected by Pittsburgh-Des Moines, you enjoy a complete service—perfected over sixty years of contracting experience. PDM provides the engineering know-how, the four-plant fabricating facilities, the construction skill and care in supervision that make the project an owners' pride from start to finish. For responsibility, ability and guaranteed satisfaction, *pick PDM!*

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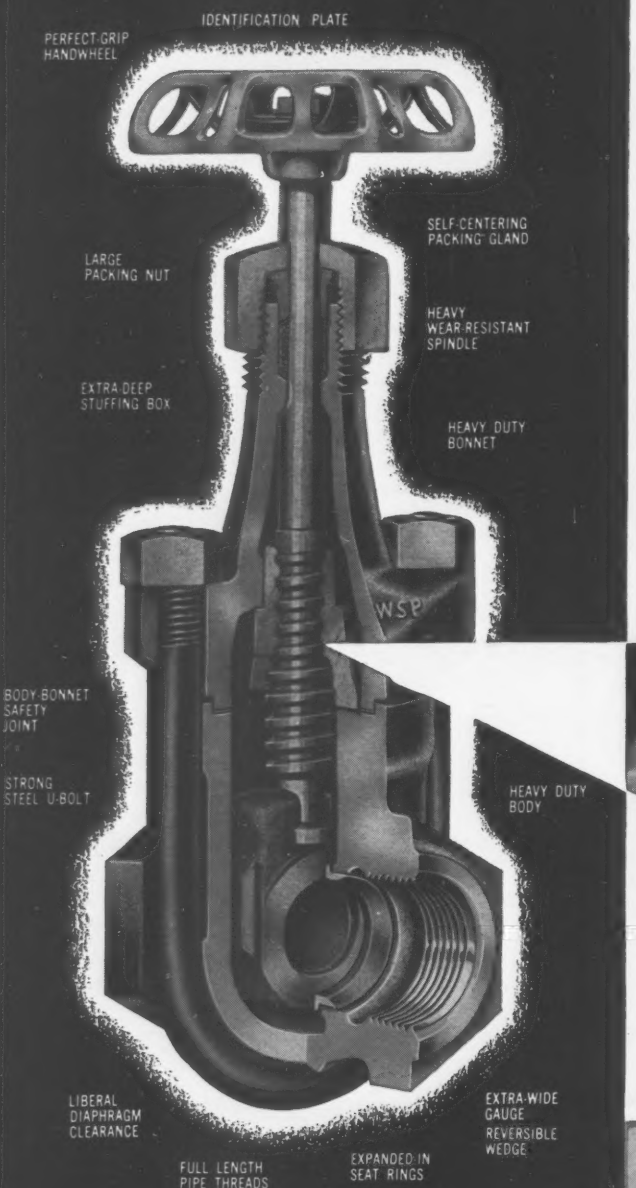

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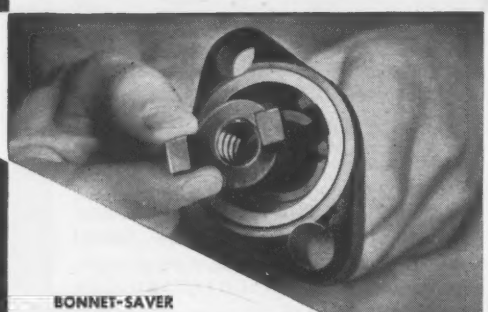

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THE CONSTRUCTION WEEK

STRUCTURAL DESIGN CONFERENCE—Program for Creative Trends in Structural Design, third National Construction Industry Conference, sponsored by Armour Research Foundation, has been finalized. A wide range of topics will be discussed, including air-supported structures, hyperbolic paraboloids, plastics, limit-load design in steel and concrete, and use of high-speed computers. The conference will be held in the Congress Hotel, Chicago, Dec. 11 and 12. Participants are invited to attend a national meeting on Dec. 10 on the proposed World Construction Year (ENR July 25, p. 25).

THE HIGH COST OF MOVING EARTHMOVERS—Earthmoving equipment must be licensed to move from job-to-job over Pennsylvania state highways, a Dauphin County court has decided. The court upheld a 1956 ruling of former State Attorney General Herbert B. Cohen. The ruling was contested in court by the Central Pennsylvania Quarry, Stripping and Construction Co., of Hazleton, Pa., a road contractor. With 80 oversize vehicles in his possession, the contractor claims such licensing will cost him $18,000-$24,000 a year. License fees run from $225 to $300 a year per vehicle.

ANNIVERSARY MARKS LIVES SAVED—Marking its 20th anniversary, the non-profit Automotive Safety Foundation threw itself a notable party at Detroit's Fort Shelby Hotel a week ago. There was a reason for the pride in the event. According to Highways Administrator Bertram D. Tallamy, in the period of the organization's life, highway fatalities have been cut by more than half, in relation to vehicle miles. Said Mr. Tallamy: In 1936, fatalities were 15.1 per 100 million vehicle miles, in 1956 they were 6.4. And there are economic benefits too, added the U.S. highway boss: A Massachusetts study of accidents on controlled access roads, vs. other highways shows the cost to be $19,000 per mile for the expressways, $90,000 a mile for others. Following up this comment, the audience was cautioned that the biggest single obstacle to the road program now remains local objections to controlled access. Remedy is for those who know the advantages to appear at hearings to combat vociferous—but uniformed protest.

NEW CITY HALL FOR CINCINNATI?—After many years of trying, Cincinnati may get a new city hall building. Fire caused extensive damage to the top two floors of the 64-year-old city hall recently. One of the main roof supports buckled. In view of the widespread dissatisfaction with the present structure, this may provide the impetus needed to make the many-time-proposed new facility a reality.

Why it pays to specify HYATT for replacement:

THE RIGHT ROLLER DESIGN AND QUALITY CONTROL

The design and quality of the *rollers* play a large part in the performance of a cylindrical roller bearing. Such features as blended chamfers or generous corner radii on all HYATT rollers reduce the adverse effects of end loading. Crowning of all Hy-Load rollers lengthens bearing life by allowing the contact area to fade out, and minimizing excessive unit loads when misalignment occurs. These and other vital factors which must be considered are briefly detailed at right. All these factors are meticulously controlled by the most modern precision equipment to insure maximum performance and life for every HYATT Roller Bearing.

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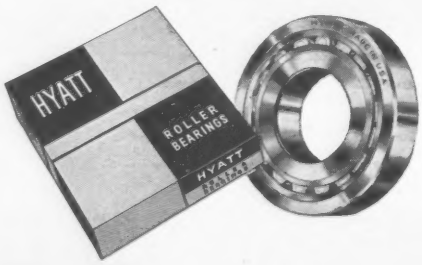
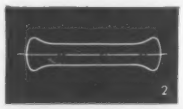


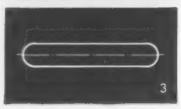
1. DISTRIBUTION OF LOAD WITHIN THE BEARING

Rollers are subjected to load only while in the "load zone," with maximum load while on the line of action of the bearing load, as shown in diagram 1. The theoretically perfect "load zone" extends from −90° to +90° from the line of action, but this is neither practical nor necessarily desirable. Under normal loadings, the actual "load zone" may range from 90° to 120°, depending on load and mounted internal clearance. This distributes the load so the load on the heaviest-loaded roller is approximately 5/N times the bearing load, where N is number of rollers.

2. DISTRIBUTION OF LOAD WITHIN ROLLER'S AREA OF CONTACT

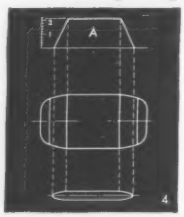
A cylinder deflects locally in the region of engagement when loaded between flat plates. The plate also deflects, so the original line of engagement is broadened into a "dog-boned" area under load, as shown in diagram 2. Moreover, deflected cylinders must gather in metal at their ends in *two planes, and this end-loading effect can seriously reduce the life of a cylindrical roller bearing.* All HYATT rollers have generous corner radii or blended chamfers to reduce end effect; and all HYATT Hy-Load rollers also have crowning to allow the contact area to "fade out" evenly (diagram 3).





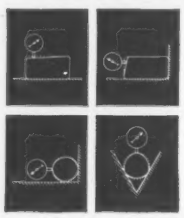
3. DISTRIBUTION OF LOAD ACROSS ROLLER

The unit load on any roller is uniformly distributed axially except at the crowned ends where it drops off to zero as shown in diagram 4. The summation of unit loads represented by area A is the total roller load. This same load under misalignment results in an area equal to area A; but maximum unit load is considerably greater and the bearing will have a shorter life than a properly aligned one. When the same total load is applied to an *uncrowned* roller, an even higher unit load results. This demonstrates the value of crowning when misalignment occurs.



4. EFFECT OF ROLLER QUALITY ON BEARING PERFORMANCE

Lack of roller quality control has a very adverse effect on performance: 1. A roller with excessive *taper* tends to uneven load distribution and abnormal temperature rise. 2. A roller with excessive *end square* tends to noisy bearing performance. 3. A roller with excessive *two-point out-of-round* tends to poor segregation and poor bearing life. 4. A roller with excessive *three-point out-of-round* tends to noisy bearing operation. 5. A roller with *poor finish* tends to wear on all operating surfaces and noisy operation. 6. A bearing with excessive *roller-to-roller diameter variation* tends to poor bearing life. 7. A bearing with excessive *roller-to-roller length variation* tends to poor thrust capacity, abnormal temperature rise.



SEE YOUR INDUSTRIAL BEARINGS DISTRIBUTOR

GM PARTS SALES

GM FORWARD FROM SIXTY

HYATT HY-ROLL BEARINGS FOR REPLACEMENT

WASHINGTON OBSERVER

- **Highway actions due in Congress**
- **Homebuilding: 1,040,000 units in '58?**
- **New TVA board member, Welch, hailed**

● **Some important highway legislation is expected out of the next Congress,** which convenes in January. Expert observers in the field think the outlook can be summed up like this:

Federal aid (50-50) for primary, secondary and urban roads will be increased about $25 million a year—up from $875 million in fiscal 1959 to $900 million in fiscal 1960 and $925 million in fiscal 1961.

The interstate system will be held as is, at 41,000 miles. It got a recent allocation of 2,102 miles from the Bureau of Public Roads.

Higher estimates of interstate costs likely will be adopted and these probably will be accepted as the basis for distribution of interstate funds to the states in fiscal years 1960-'61-'62. The Bureau of Public Roads will submit the re-estimates to Congress on January 12.

Delay is expected on two big proposals. One would reimburse states for tollroads built since 1947 and adopted into the interstate system. Many persons feel that Congress will postpone any such payments until the 15 year interstate construction program is complete. Congress likely will take no final action either on a bill that proposes to prohibit payment of federal monies to utility companies for relocation of facilities on highway rights-of-way, even in states where relocation costs are legally recognized as a reimbursable expense at the present time.

—

● **Government economic forecasters expect 1,040,000 privately financed housing starts next year**—a solid, but not startling, improvement over this year's disappointing homebuilding performance.

The government's forecast of an upturn is based almost entirely on a softening of demand for investment capital in other economic sectors. The dominant Washington theme is that, by the last half of 1958, this "surplus" of investment money will be making itself felt in the mortgage market.

But some homebuilders are turning nervous about the market. Their line: The same softening of business that causes a loosening of investment capital is causing many a worker to worry about his job and turn supercautious about taking on any long-term debt. They say extremely stiff buyer resistance is already showing up in areas hurt by defense layoffs.

—

● **Public power partisans are happy about Frank J. Welch's appointment to the Tennessee Valley Authority board of directors.** Mr. Welch is a Democrat, an economist, and dean of agriculture at the University of Kentucky. He has lived all his adult life in the TVA area.

Friends of TVA say this choice is easily the most popular one that President Eisenhower has made for the board. They think that Mr. Welch's presence on the board will make it easier next session to win Congressional authority for TVA to issue its own revenue bonds to finance new power generating facilities worth a half-billion dollars or more.

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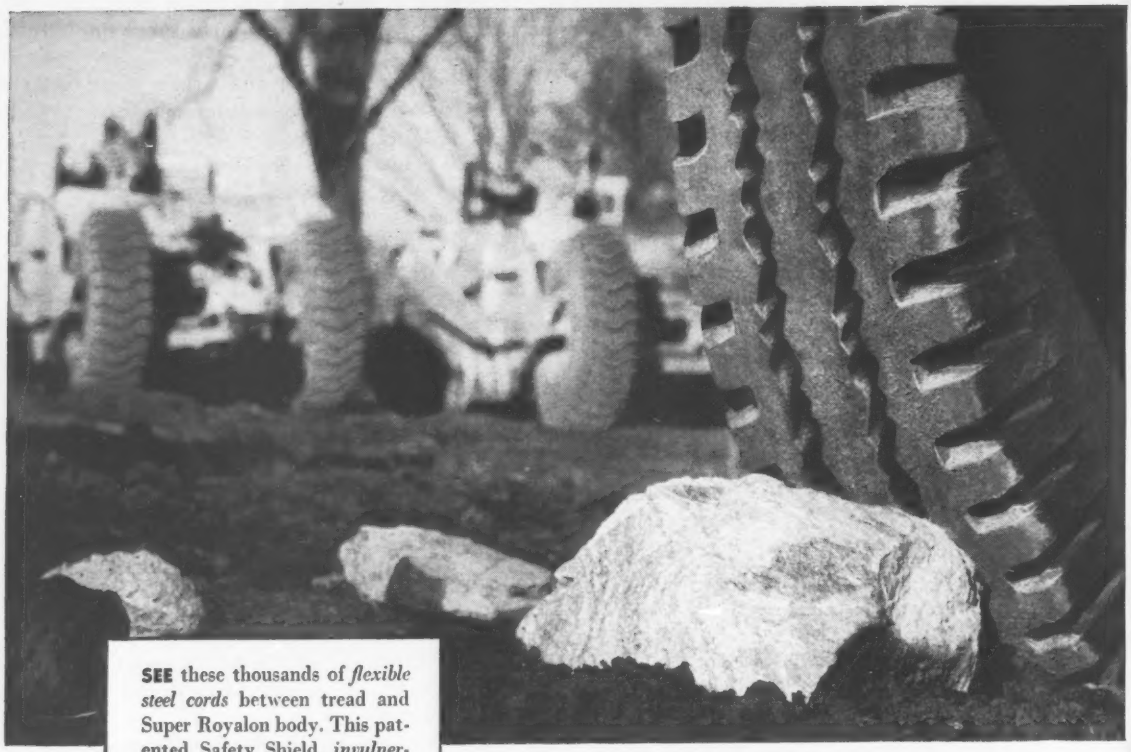
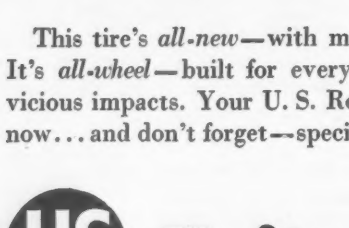


SEE these thousands of *flexible steel cords* between tread and Super Royalon body. This patented Safety Shield, *invulnerable* to cuts and ruptures, prevents tire failure in the tread area . . . cuts job delays and job costs 'way down!



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In the Western Hemisphere . . .

Latin American postwar construction was a market for U. S. firms exclusively. Now, native companies and European constructors are chipping away at this supremacy. At the same time . . .

In the Eastern Hemisphere . . .

The dominance of the U. S. in global construction is being pierced by strong thrusts from Germany, France, Italy and Britain. And, on the horizon, is increased activity from Holland, Belgium, Denmark, Sweden and Japan.

For U. S. engineers and contractors the . . .

Competition Tightens Overseas

U. S. construction and engineering firms operating abroad are running full tilt into vigorous competition from their European counterparts.

Immediately after World War II, European firms were busy rebuilding their own countries, but since then they have developed the resources to move and to build outside their national boundaries. Now, they are starting to reap a rich harvest in fields once dominated by companies from the United States.

A world-wide ENR survey of 50 major construction firms doing business internationally shows that although U. S. firms are still receiving a generous share of foreign contracts, their percentage of the total work available is declining. And this reduction comes in the face of an increasing volume of overseas construction activity.

But the survey shows too that the U. S. firms are fighting back with the weapons of price, financing and diplomacy to keep and enlarge their current overseas construction volume, which—according to one estimate—totals between $750 million and $1 billion per year.

• **Who are the competitors?**—The companies that provide the toughest competition come, in order, from Germany, France, Italy and England. Lately, it has been noted that Holland, Belgium, Denmark, Sweden and Japan also are developing strong construction combinations which show an inclination to enter the global construction arena.

In 1956, German construction firms had an estimated $170 million worth of construction under way in foreign countries as compared with $120 million in 1955. Their current backlog of orders is estimated to range from $250 million to $500 million. These companies hold large contracts in the Near East and in South America.

Between May 1955 and May 1957, French enterprises won 75 foreign construction contracts for public works and industrial projects. Their major areas of activity are in the Middle East and North Africa.

Italian companies are also strong adversaries, with 30 major engineering and contracting firms currently working on foreign projects having a value of $160 million. The Italian builders and engineers are doing most of their work in the Middle East, North Africa and Latin America.

British contractors, during the year ending March 31, 1957, had obtained work valued at $258 million in 50 countries. However, their biggest customers are commonwealth countries where former colonial ties provide a strong advantage. The oil areas of the Middle East are also important customers for the British firms.

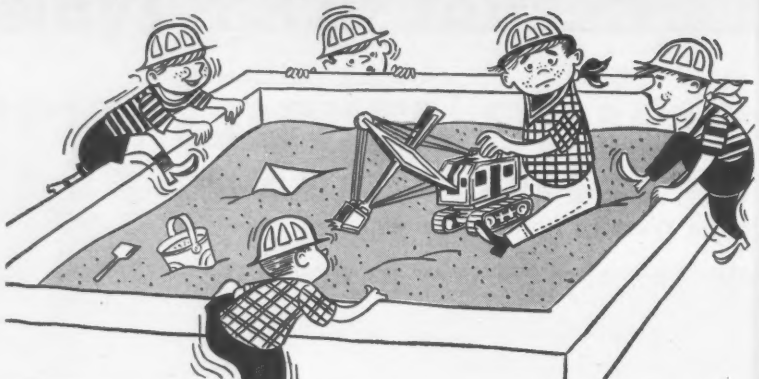
But no matter where they do business, these competitors do not limit themselves to any particular type of work. They are anxious and willing to go after any job.

Large public works projects were once

. . . American constructors feel the pinch of competition abroad

considered to be strictly an American specialty. But now it is apparent that European firms are capable and willing to challenge the Americans for the biggest jobs.

They compete in every field of engineering and construction. For example, an Italian combine last year won the major contracts for the $96 million Kariba Dam, a large part of Africa's biggest hydroelectric project.



STEPPING INTO the field of global construction, the European constructors are eagerly competing with U. S. engineers and contractors for jobs at all points in the world.

• **And from another source**—In Latin America a new source of competition is developing for both U. S. and European companies—local contractors.

Capital investment in construction machinery by local governments and individuals has been accelerating ever since World War II. This has encouraged the formation and growth of Latin American companies. But it also should be noted that while the Latin Americans have been apt pupils, the teachers were construction men and engineers from the United States.

Working for so long on so many projects with contractors and engineers from the United States, the local organizations acquired know-how. They started to tackle jobs within their own borders and have now gained enough experience and aggressiveness to seek jobs outside their own borders.

Mexico, for example, now has six national contracting firms capable of handling jobs costing up to $800,000. And one or two can tackle jobs costing $1 million or more. In the big picture, however, the major projects in Latin America are still going to foreign and U. S. companies.

• **How do they do it?**—According to U. S. construction men, the major competitive weapon in the hands of the Europeans is financial. Foreign construction firms receive from their own governments both financial assistance and insurance against loss on ventures outside their own country.

Other advantages held by European firms include:

- Lower labor and personnel costs.
- Extensive use of European construction materials which cost less than comparable products manufactured in the United States.
- Willingness of European manufacturers to extend credit on their equipment such as turbines and generators.
- National ties. British firms for example, are well known throughout the dominions and commonwealths and in these countries it is difficult for other than British firms to obtain contracts.
- Cooperation of European embassy officials, who in foreign countries, assist their national firms to obtain work by actively seeking and providing news of projects being considered.
- An increasing trend in Europe to create large consortiums—association of banking interests—who share the risk and raise capital sufficient for the undertaking of large-scale contracts.
- Package deals for underdeveloped countries that include project financing, construction and operation.
- International politics that occasionally prohibit contract awards to a U. S. company.

• **The counterattack mounts**—U. S. companies, however, are not standing around with their hands down. They are moving in with sharp jabs aimed at keeping the competition off balance.

Many are competing with a basic weapon—price. Of the total surveyed, 66% reported that they had reduced their profit margins, but they did not disclose to what extent or provide comparative figures.

LOCAL CONTRACTORS—having gained experience from working with foreign firms —are increasing in numbers and capacity.

The U. S. companies also are helping prospective clients obtain financing for proposed projects. Some are agreeing to longer terms of payment. Others express willingness to accept foreign currency as payment instead of dollars. However, if a U. S. company has spent dollars, it usually requires reimbursement in dollars.

E. W. Littlefield, executive vice president of Utah Construction Co. said that as far as his company is concerned, it will take its profit in foreign currency if necessary.

This same firm sometimes works out a commodity payment deal. C. S. Davis, vice president, said that to help Cuba finance a tunnel under the Havana estuary, "we offered to take 50% of our payment in sugar." He added that the company had found a market for the product and that the ability to find a ready buyer for any commodity it might accept as part payment would be the deciding factor in arranging this type of payment.

In the Havana tunnel case, however, Utah lost the job when an alert foreign competitor topped the offer by accepting the cash portion of the payment over a period of 20 years.

American companies are also adopting a well-established practice in military and political circles—"if you can't beat 'em—join 'em."

Affiliation with a European firm enables a U. S. engineering or construction company to obtain the benefit of lower European labor rates and lower mobilization costs. Such a move reduces profits for each of the parties to the agreement but it also cuts risks and

increases the chances of obtaining a job.

In some Latin American countries, it is the only way to obtain a contract because a strong nationalistic spirit demands an alliance with a local contractor or engineer. The foreign company provides the know-how, equipment and materials. The local firm supplies the labor, local contacts and local market information.

• **Other tactics**—American companies have other means of competing:

• More extensive use of European materials on foreign projects. They are cheaper than the American counterpart and allow the U. S. company to compete on a more equal footing.

• Reduction in the number of U. S. personnel abroad and greater use of local subcontractors. U. S. manpower is expensive and puts American costs of supervision completely out of line.

• Greater selectivity. U. S. companies now aim at jobs requiring special equipment, experience or design patents. Kaiser Engineers reports that its competition is most acute on small projects and therefore finds it is not profitable to go after jobs costing less than $25 million.

• Greater sales efforts. The U. S. companies are more intensively and extensively selling themselves on their ability to get a job done fast, their use of better equipment, greater availability of supplies and fast delivery of materials.

Kaiser Engineers' current job in India, a $130 million steel plant expansion, was won for the company when it promised delivery in 30 months. During the investigative phases of the project, India found that competitors could offer lower prices for the job, but completion estimates ran as high as four years. In this case speed was the deciding factor since India realized that the saving in time was worth more than the apparent construction economy offered by others. The quicker more steel was produced, the quicker would the nation's economic health be improved.

Also working in favor of the American companies is this country's International Cooperation Administration. This agency, which provides funds for development assistance abroad, is partial to U. S. companies. And the Export-Import Bank's program (ENR June 13, p. 35) also gives a big boost to American construction efforts around the world.

• **Into the future**—U. S. companies anticipate that competition will become more severe, but barring unforeseen developments, opportunities abroad should remain good.

Construction leaders report that the world political climate and the growth of nationalism in underdeveloped countries are factors that will have much to do with the overall level of construction.

Some believe that the improvement in foreign firms' technique, equipment quality and know-how will eventually be counterbalanced by boosts in European price and wage levels. If the latter occurs, the European firms will be competing on a cost basis closer to those of American companies.

In any event, U. S. companies are convinced that they will continue to be a force to be reckoned with in world construction.

How to Figure Tunneling Costs

Geological Society of America gets right down to cases in discussing method of cost estimate based on geology

Unbalanced bidding is not a topic to be expected at the annual meeting of the Geological Society of America, but it came in for appropriate mention at one of the two lively sessions of the Division on Engineering Geology of this leading scientific society, during the course of its 70th annual meeting in Atlantic City, N. J., Nov. 4-6.

L. B. James, of the California Department of Water Resources, described how his organization has developed a method of estimating tunnel costs, for use in the planning of the state's great water development program. By studying cost and progress records of over 130 tunnels, and by using seven broad geological classifications, Mr. James showed how a series of charts for estimated heading progress relative to tunnel diameter has been prepared. Use of these charts, with appropriate labor and plant unit costs, enables total tunnel costs to be estimated.

Actual bids on the first tunnels to be called for in the California project gave reasonably good agreement with estimates prepared in this way, except in one case when the unit bid prices were obviously unbalanced.

• **Rock "rebound"**—Three papers were presented describing in some detail the troubles encountered during the construction of the Oahe Dam, on the Missouri, by the U. S. Corps of Engineers, due to rebound of the Pierre shale, particularly in the excavation for the large stilling basin of the outlet works. Remedial measures which have been adopted were described; they include installation of deeply embedded anchor bolts and some re-proportioning of concrete sections. These additions have added about 25% to the cost of this part of the project, but they appear to have been successful in controlling further movement. Extensive discussion disclosed that such rebound movements of presumably solid rock are not confined to the Pierre shale of the midwest; similar but not so serious examples were mentioned as having occurred in the vicinity of the Great Lakes and in other locations.

Geological features of the Hanabanilla hydroelectric project in Cuba were described by R. Roddy: The works involved include both earth and rockfill dams, with the main valve control chamber and the powerhouse both underground (ENR June 14, 1956, p. 73). Diorite gneiss, the oldest and most resistant rock of the area, is fortunately the rock in which these underground installations are to be located so that no unusual construction problems are anticipated and a minimum of lining will be required.

• **Glen Canyon explorations**—W. H. Irwin of the U. S. Bureau of Reclamation discussed the engineering geology of the site of the giant Glen Canyon Dam on the Colorado River. This 700 ft high structure will be unusual in that it will be completely founded on the Navajo sandstone known to be at least 1,300 ft thick at this location. Exploratory drilling included angle holes drilled approximately parallel to the ultimate resultant thrusts of the dam at selected elevations in order to insure proper evaluation of the elastic properties of the rock along these thrust lines.

The Engineering Geology Division has sponsored two publications of very general interest which are now available. "Engineering Geology Case Histories, Part One," edited by Parker Trask, is a collection of concise accounts of the geological aspects of eight widely differing engineering projects. "Teaching Aids and Allied Materials in Engineering Geology," is a comprehensive survey of books, visual aids and other material of use in geological course of instruction for engineers prepared by a committee headed by George A. Kiersch. The report contains much that will be of real value, in this convenient form, to practicing engineers also. Copies of the publications, costing $1, and 75 cents, respectively, can be obtained from the secretary of the G.S.A., at 419 West 117th St., New York 27, N. Y.

E. O. Dobrovolny of the U. S. Geological Survey, Denver, is the new chairman of the Engineering Geology Division; R. H. Nesbitt and S. C. Happ of the U. S. Corps of Engineers are vice president and secretary respectively.

Salty Symposium

Water desalter squabble; research shows progress

Desalting of brackish water is now possible at a cost that industries and municipalities in arid regions can afford. This is what 200 experts on saline water conversion heard at an international symposium in Washington, D. C., last week.

South African gold mining companies now are building a $1 million plant in the Orange Free State to produce 3 mgd (U. S. gallons) of desalted water at a total cost of 29 cents per thousand gal. Using an electrodialysis process and long-life membranes developed by the South African Council for Scientific and Industrial Research, the plant will desalt water of 3,000 ppm (parts per million) total dissolved solids to 500 ppm in two stages with four multi-pack presses in each.

South Africa's contribution of research findings highlighted the three-day symposium, and sparks flew at several sessions as criticism mixed with commendation of the Office on Seawater, Department of the Interior, which co-sponsored the three-day meeting with the National Academy of Sciences–National Research Council.

Expressions of dissatisfaction with the handling of the symposium and of the overall saline conversion program by the government-financed OSW came from the Maxim Silencer Co., and Alexander Zarchin, Israeli scientist who claims he can make seawater potable for 10 cents per thousand gal.

Garbled press reports from Maxim Silencer's home city of Hartford, Conn., stirred up a sense of dramatic conflict in the nation's newspapers during the 48 hours preceding the symposium.

And as things turned out, the symposium heard not a word about the Maxim system.

Aside from the minor fireworks—touched off by misunderstanding and not by malice—the symposium produced a solid body of evidence that advances are being made in all processing methods toward the economical range for industrial and municipal water. That goal is roughly expressed as 40 cents or less per thousand gal.

Comments of OSW director David S. Jenkins were keynoted by his statement that conversion must never be considered a substitute for conservation.

In his opening remarks, Mr. Jenkins also noted that it may be necessary to continue federal assistance beyond the point originally intended in order to carry process developments to the stage that makes them financially attractive to equipment manufacturers.

Capt. E. J. Peltier

New BuDocks Chief

Capt. E. J. Peltier named to succeed Admiral Meade

On Dec. 1, Capt. Eugene J. Peltier (CEC-USN) will become Chief of the Bureau of Yards and Docks and a rear admiral. He will take over the top job in the Navy's Civil Engineer Corps from Rear Adm. Robert H. Meade, who is retiring after 31 years service.

President Eisenhower recently broke the news by announcing Captain Peltier's appointment to the post (subject to Senate confirmation).

Captain Peltier won the nomination over six admirals and 33 captains who are senior to him. He is the first of the reserve officers integrated into the regular Navy after the war to become chief of the bureau. In the post of BuDocks chief, Captain Peltier will administer, through his district public works officers, about a half billion dollars of construction each year.

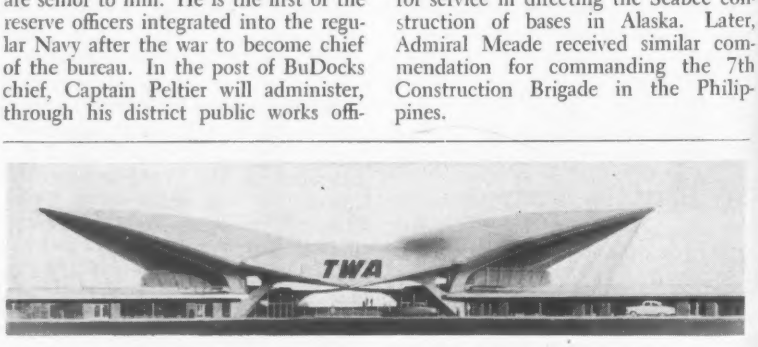
Captain Peltier has built a solid reputation during 17 years of active service with the Navy. Most recently he has distinguished himself as commanding officer of the Naval Construction Battalion (Seabee) Center at Port Hueneme, Calif., since February, 1956, following two years as assistant chief of BuDocks for maintenance and materiel in Washington. In the latter job, he revamped maintenance concepts and operations to emphasize the engineering phase of this activity.

The new chief received a BS in civil engineering from Kansas State College in 1933 and a master's degree from the same school a year later. For six years thereafter he was a resident engineer for the Kansas State Highway Commission.

As a reserve officer called to active duty in 1940, he served in civil engineering and construction posts and took Seabee training in the States before taking command, in February 1945, of the 137th Battalion which landed in Okinawa. Seven months later he formed and became officer in charge of the 54th Naval Construction Regiment on the same island.

After the war, Captain Peltier came back to serve as public works officer at several bases and then took over in 1951 as district public works officer of the 14th Naval District at Pearl Harbor.

Admiral Meade graduated from the Naval Academy in 1927, after which he gained a civil engineering degree from Rensselaer Polytechnic Institute. Prior to becoming BuDocks chief, he served as director of construction of the Spanish bases program. During World War II he received the Legion of Merit for service in directing the Seabee construction of bases in Alaska. Later, Admiral Meade received similar commendation for commanding the 7th Construction Brigade in the Philippines.



Vaulted Roof Planned for Air Terminal

Trans World Airlines announced plans yesterday (Nov. 13) for building a new $12 million terminal at New York International Airport. Designed by architects Eero Saarinen & Associates, Bloomfield Hills, Mich., and structural engineers Ammann & Whitney, New York, the structure will comprise four vaulted concrete roof shells supported on concrete frames. Sides will be glass.

Construction is expected to start next April. Completion of the first section is planned for mid-1959, with the remainder to be placed in service by January 1960.

$614 Million in Bonds Okayed by Voters

Approval of 81% of total, down from 1956's 90%, may indicate stiffer resistance to debt and taxes

The construction industry can look forward to some healthy public works contracts next year as a result of last week's election which saw the voters place their approval on a total of $614 million in bond propositions. As reported by ENR, construction bond proposals across the nation tallied $779 million, but up until early this week $14.9 million of that amount had not been reported from the smaller communities of the country.

However, of the grand total $764.2 million entered the backlog and 81% received the voters' nod. Some of the total will result in contract awards during the coming year, although some major issues will serve only to provide the push for some large, long-range programs.

Although a large proportion of the total was approved, it does not compare as favorably with last year when 90% of the issues placed on ballots and voting machines received the public's go-ahead signal.

The rejection this year of $150.2 million—or 19%—may possibly indicate a stiffer attitude toward increasing debt and taxes. This point is underlined by the fact that last year a record $2.7 billion in bond issues was placed before the voters, as compared to the under-$1 billion presented this year.

So far this year, however, and prior to the November 5 voting, a total of $1.7 billion was approved at special elections from January through October. The latest vote now brings this year's total to more than $2.3 billion. This figure is sure to fall below the record $4.6 billion waved ahead by the electorate in 1956, despite the fact that a few bond issues will make their appearance between now and the end of the year. The final figure, however, may come close to the $2.8-$2.9 billion of 1954 and 1955.

• **The bright side**—There is one cheering point to the small amount of issues approved—it could actually help state and municipal government by easing the huge backlog of bonds yet to be marketed. With some of the edge off competition for the investors' dollar, interest rates might dip slightly in 1958. Any such reaction would thus help the municipalities and states to save money on long-term borrowings to be used for new construction.

An interest dip could also help speed the marketing of those bond issues which have been awaiting for a more favorable situation so far as interest rates are concerned. In addition, it could also mean a shorter wait between the date approved and the date of sale for those bond issues that were approved last week.

• **Among the giants**—Two huge bond issues that received the resounding approval of voters were a $250 million proposal in New York State and a $200 million issue in Texas. In New York State a two-to-one vote gave the green light to a constitutional amendment that would authorize the bonds for expansion and improvement of the state's university system. This would be a five year program.

Texas voters also approved a constitutional amendment establishing a State Water Development Board with the authority to issue $200 million in bonds for the construction of dams.

In Philadelphia bond issues of $26.9 million were slammed through by a healthy margin. The money obtained by the sale of the bonds will pay for modernization and extension of various city departments.

• **Some big defeats**—Not all was rosy on the bond front. San Francisco voters stamped hard on a $22.6 million issue to remodel the court house and city hall.

In Cleveland, voters turned their back on a $15 million airport, a $1.3 million board of elections building, and a $1 million zoo. They went along with a $1.2 million schools issue, however.

Detroit voters stymied a $9.5 million bond issue that was to have financed Port of Detroit developments.

What Election Day Did to the Bond Issues

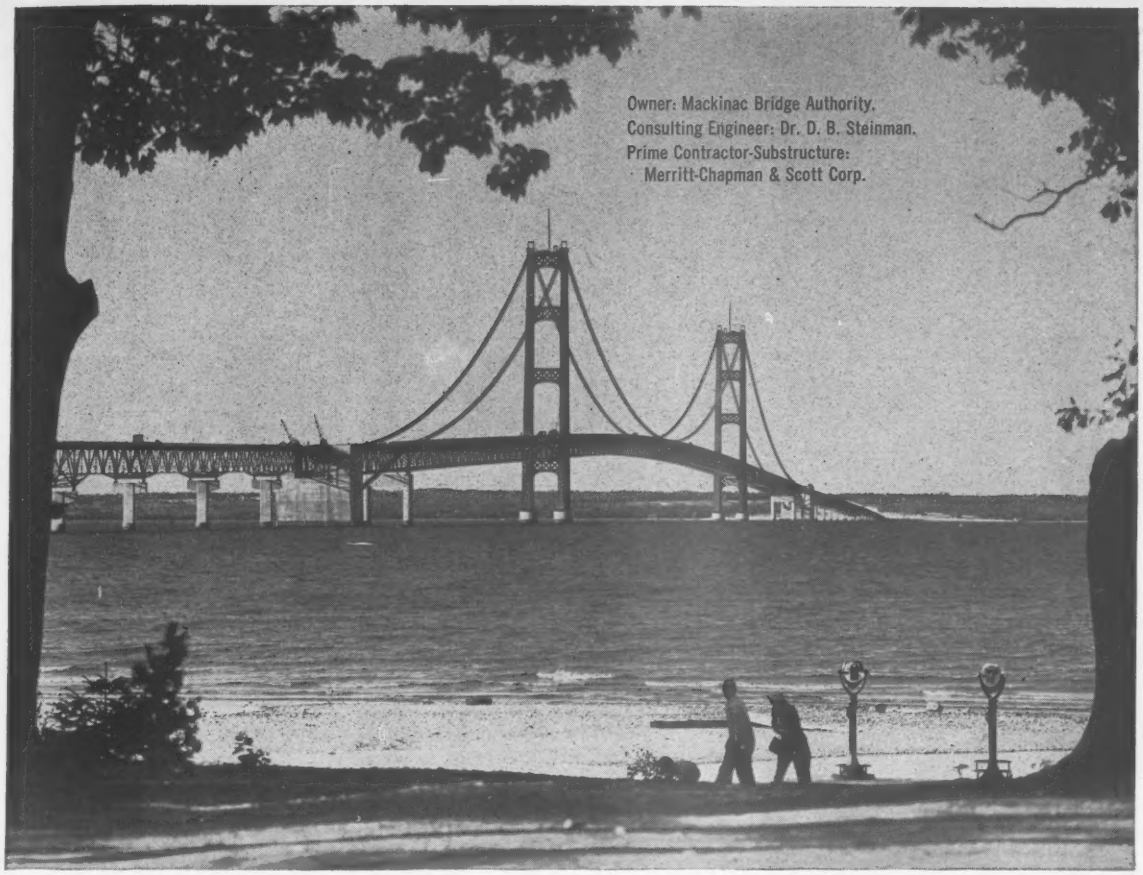
State and City	Project	Amount	Outcome
ARKANSAS			
Little Rock	Library improvement	$1,295,000	Passed
CALIFORNIA			
Cupertino	Schools	3,000,000	Passed
Hawthorne	School	700,000	Passed
San Francisco	Courthouse and remodeling city hall	22,150,000	Rejected
COLORADO			
Aspen	Water system impr.	185,000	Passed
Boulder	Airport impr.	50,000	Passed
	Recreation facilities	500,000	Rejected
Brighton	Park & swim pool	100,000	Passed
Golden	City hall	150,000	Rejected
Gunnison	Filtration plant	309,000	Rejected
Littleton	Parks, swim pool tennis courts	250,000	Rejected
Longmont	Sewers, disposal plant, etc.	450,000	Passed
Manitou Springs	Swim pool	55,000	Rejected
Pueblo	Sewage treatment plant	1,100,000	Passed
	Swimming pool	125,000	Passed
Thronton	Municipal bldg fire & police station	130,000	Passed
CONNECTICUT			
Hartford	Municipal improvements	6,825,000	Passed
KENTUCKY			
Covington	County jail	875,000	Rejected
	Elementary school	500,000	Rejected
Fort Thomas	Swimming pool, bath house	245,000	Rejected
Louisville	Slum clearance	5,000,000	Passed
Owensboro	Courthouse and jail	1,250,000	Passed
MICHIGAN			
Dearborn	Sewers	4,700,000	Passed
Detroit	Port development	9,500,000	Rejected
Hamtramck	Slum clearance	1,950,000	Passed
Kalamazoo	Storm, sanitary sewers	1,970,000	Passed
Lincoln Park	Relief sewers	2,670,000	Passed
Saginaw	Relief sewers	3,600,000	Passed
MINNESOTA			
Duluth	Jail	400,000	Rejected
MISSOURI			
Jefferson City	Street widening, etc.	2,875,000	Passed
Sedalia	Municipal building	1,000,000	Rejected
NEBRASKA			
Buffalo County	School building	2,080,000	Passed
Kearney	School	2,080,000	Passed
NEW YORK			
State of N. Y.	State university building	250,000,000	Passed

(Continued on page 30)

—What Election Day Did to the Bond Issues—

State and City	Project	Amount	Outcome
OHIO			
Akron	Jail, office bldg	4,500,000	Rejected
Ashtabula	Elementary school	670,000	Passed
Avon Lake	High school	1,600,000	Passed
	Repairs and additions	400,000	Passed
Batavia	County hospital	2,000,000	Rejected
Bay Village	City hall	365,000	Rejected
	Swimming pool	185,000	Rejected
Bedford	Municipal building	350,000	Passed
	Storm and sanitary sewers	250,000	Passed
	Streets	150,000	Passed
Bellaire	Schools	900,000	Rejected
Belmont	Schools	480,000	Passed
Berlin Heights	School addition	385,000	Passed
Bowling Green	High school	1,348,000	Rejected
Brecksville	Schools	1,400,000	Rejected
Brewster	Schools	1,300,000	Rejected
Bucyrus	County home for aged	640,000	Rejected
Canton	School additions	680,000	Passed
Carlisle	Grade school additions	450,000	Passed
Chardon	County jail	425,000	Rejected
Chillicothe	School	4,500,000	Passed
Cincinnati	School	750,000	Passed
	School	1,200,000	Rejected
Cleveland	Elections building	1,250,000	Rejected
	Court house, criminal courts	4,000,000	Rejected
	Exhibition hall	15,000,000	Rejected
	Schools	1,200,000*	Passed
	Bridge	5,000,000	Passed
	Freeway	6,000,000	Passed
	Incinerator	3,000,000	Passed
	Airport	3,500,000	Rejected
	Zoo impv.	1,000,000	Rejected
Cleveland Hgts.	Sewerage improvements	2,500,000	Passed
	City hall	800,000	Rejected
	Schools	2,400,000	Rejected
Copley	Elementary school	600,000	Passed
Cortland	Elementary school	372,000	Rejected
Cuyahoga Falls	Expressways	2,500,000	Rejected
Dayton	Juvenile center and courts	1,500,000	Passed
	Elementary school	395,000	Passed
Defiance	Schools	980,000	Rejected
Delaware	High school, improvements	1,555,400	Rejected
Dover	Schools	1,100,000	Rejected
East Cleveland	Student center and six schools	4,850,000	Passed
Eaton	Grade school	700,000	Rejected
Elyria	School additions	3,500,000	Rejected
	Courthouse	4,522,000	Rejected
Euclid	Sewer improvements	2,000,000	Passed
Fairless	School	1,300,000	Passed
Fairview Park	Swimming pool	500,000	Rejected
Forest Hills	Schools	1,620,000	Rejected
Franklin	School	550,000	Rejected
Fremont	Home for aged	1,185,000	Rejected
Greenfield	School and field house	775,000	Rejected
Greenwich	High school, repairs	890,000	Passed
Guernsey County	Court house and jail	1,300,000	Rejected
Hamilton	Underpass	2,500,000	Rejected
	Street improvements	1,000,000	Rejected
	Bridge	2,000,000	Rejected
	Storm sewers	2,000,000	Rejected
	Sanitary sewers	1,500,000	Rejected
Indian Hill	Elementary school	975,000	Passed
Kent	Water system improvements	200,000	Rejected
	Trunk sanitary sewers	200,000	Rejected
	Storm sewers	250,000	Rejected
Kettering	Streets	2,090,000	Rejected
	Schools	2,500,000	Passed
	Sewers	610,000	Rejected
LaGrange	Sewage disposal plant	135,000	Rejected
Lakeside	School	539,000	Rejected
Lakewood	City hall	1,750,000	Passed
Lima	Courthouse repairs	550,000	Rejected
Madeira	Storm sewers	357,000	Rejected
Maple Heights	Pools with tennis courts	800,000	Passed
	Bus garage	225,000	Passed
Marblehead	Waterworks	100,000	Passed
Marion	Hospital additions	750,000	Rejected
Marlboro	High school	1,150,000	Rejected
Marlington	Schools	1,150,000	Rejected
Massillon	School	960,000	Rejected
	High school	1,100,000	Rejected
Mayfield Heights	Swimming pool	150,000	Passed
Mayfield Village	Paving and sewers	650,000	Rejected
Mentor	Elementary school	700,000	Passed
Mineral Ridge	Schools and additions	1,100,000	Passed
Morgan	School building	1,395,000	Rejected
Mount Healthy	School additions	1,000,000	Rejected
New Boston	Sewers	1,200,000	Rejected
North Olmsted	School	650,000	Passed
Norton	School additions	475,000	Rejected
Norwood	School	750,000	Passed
Oberlin	Schools	443,500	Rejected
Ottawa	County home	600,000	Rejected
Painesville	Sewers	1,094,000	Rejected
	Schools additions	885,000	Passed
Portage County	Courthouse	1,500,000	Passed
Portsmouth	Storm sewers	1,200,000	Rejected
Ravenna	Courthouse, offices and jail	1,500,000	Passed
Reading	Pools	150,000	Rejected
Ridgeville	Schools	575,000	Passed
Rocky River	Sewers and disposal plant	1,300,000	Passed
St. Henry	Waterworks	65,000	Passed
St. Marys	Schools	995,000	Passed
Sandusky	Swimming pool	140,000	Passed
	County home	1,135,000	Rejected
Shaker Heights	Recreation center, pool	1,000,000	Rejected
	Storm, sanitary sewers	3,000,000	Passed
	Storm sewers	3,000,000	Passed
Sharonville	School	500,000	Passed
Sheffield	Water system	200,000	Passed
Shiloh	School repairs	890,000	Rejected
Somerset	High school	855,000	Passed
South Euclid	Junior high school	2,500,000	Passed
	Sewers	900,000	Passed
Sycamore	Schools	1,200,000	Rejected
Tiffin	High school, remodeling high schools	1,975,000	Rejected
	Airport	185,000	Rejected
Timberlake	Sewers	125,000	Passed
Toledo	School expansions	5,000,000	Passed
Trumbull County	Jail, office bldg.	1,800,000	Passed
Tuslaw	Schools	1,100,000	Rejected
Van Wert	High school	1,700,000	Rejected
Warren	Schools	3,300,000	Passed
	Storm relief sewers	3,500,000	Rejected
	Jail, office building	1,800,000	Rejected
Washington Court House	Hospital addition	645,000	Rejected
Wauseon	Sewer expansion	250,000	Passed
Wickliffe	School additions	965,000	Passed
OREGON			
Jackson County	School, building	1,786,000	Passed
Klamath Falls	Sewer	1,800,000	Passed
Medford	Schools	1,786,000	Passed
PENNSYLVANIA			
Mt. Lebanon	Library	450,000	Rejected
Philadelphia	Various purposes	26,895,000	Passed
Pleasant Hills	Swimming pool	300,000	Rejected
West Mifflin	School	3,000,000	Passed
TEXAS			
Dallas	Curbs, gutters, storm sewers	7,435,100	Passed
Edna, Precincts 1–4	General road improvements	334,000	Passed
Marshall	Courthouse	1,000,000	Passed
San Antonio	County jail	3,000,000	Rejected
	Road improvements	2,750,000	Passed
	Waterworks	312,000	Passed
	Sanitary sewer system	250,000	Passed
State of Texas	Water Development Board	200,000,000	Passed
VIRGINIA			
Martinsville	Sewer system	3,700,000	Rejected
Waynesboro	Civic improvements	1,070,000	Rejected
	School, firehouse	185,000	Passed
WASHINGTON			
Tumwater	Street repair, resurfacing	180,000	Passed
WYOMING			
Fremont County	Hospital	258,000	Passed
Riverton	Building and school	890,000	Passed

Mill levy to finance $9,468,000 school building program over next three years


Owner: Mackinac Bridge Authority.
Consulting Engineer: Dr. D. B. Steinman.
Prime Contractor-Substructure:
Merritt-Chapman & Scott Corp.

There's more to Mackinac than meets the eye

The graceful superstructure of the new Mackinac Bridge is an outstanding example of bridge building at its finest. Visible for many miles above the northern Michigan countryside, the 552 ft. main towers present a spectacular picture.

A less conspicuous, but equally important part of this engineering triumph, lies in the deep, treacherous waters of five-mile wide Mackinac Straits. Some 451,000 cubic yards of concrete went into the 34 piers comprising the bridge's substructure. One anchorage pier alone contained 91,600 yards, and tower piers were founded as much as 210 ft. below the surface.

The substructure contractor was faced with a formidable combination of hazardous water, unpredictable weather and a tight construction schedule. To minimize delays and risks under such difficult operating conditions, the unique Prepakt* method of concrete placement was selected. How completely this confidence was justified is a matter of record —in fact, a world record.

During the first construction season, the substructure contractor, working with expert Prepakt crews, set new records for underwater concrete placement from a single floating plant. The following year these marks were broken with new world records of 6,250 cubic yards of Prepakt concrete in a single day, 33,068 yards in seven days, and 103,400 yards in a 30-day period. Prominent authorities have stated that without the use of Prepakt concrete, another full year might have been required to complete the Mackinac Bridge. Certainly its use precluded the mobilization of much additional personnel, materiel and floating equipment.

Such performances on tough projects are typical of I-P operations. Patented methods and materials in the hands of experienced personnel offer unmatched speed, economy, consistent quality, and flexibility under adverse conditions. These advantages have been successfully demonstrated on many types of work in every part of the world. For more information on Prepakt concrete and other I-P services, contact: Intrusion-Prepakt, Inc., Room 568-L Union Commerce Bldg., Cleveland 14, Ohio. In Canada: Intrusion-Prepakt, Ltd., 159 Bay Street, Toronto, Ontario.

INTRUSION-PREPAKT, INC.

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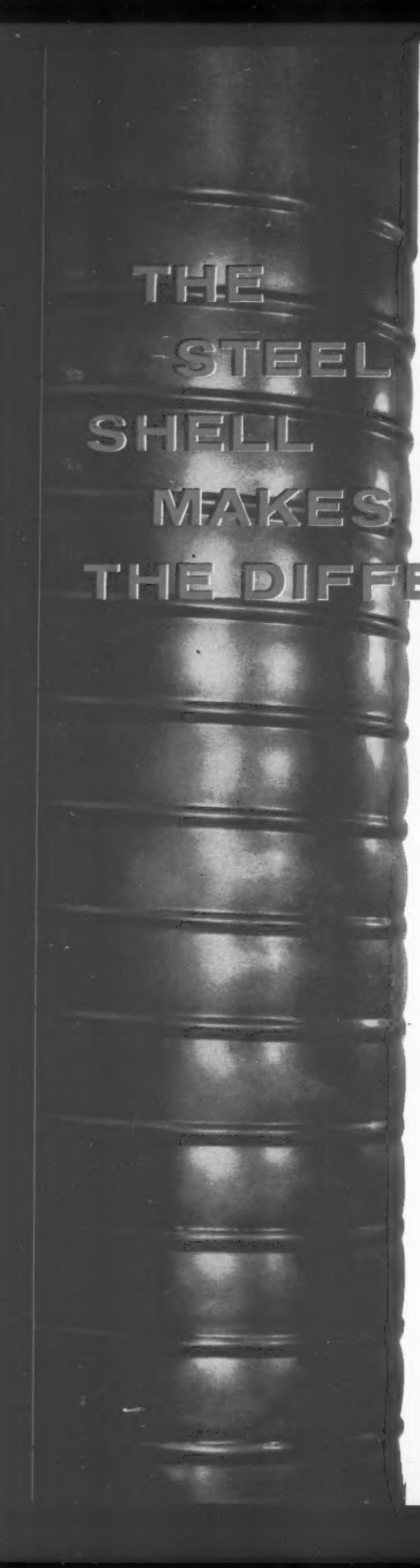
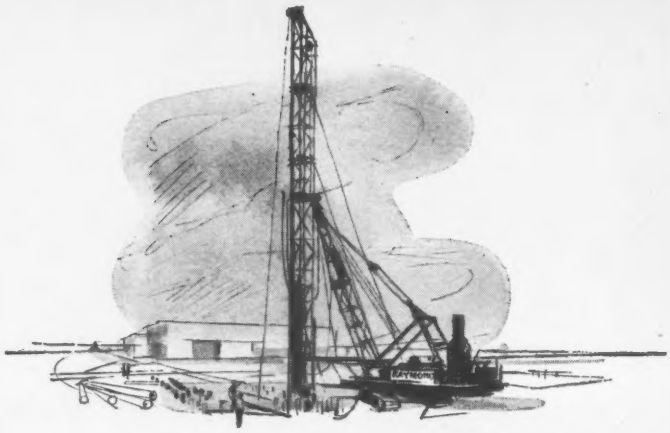
*Intrusion and Prepakt are trade marks of Intrusion-Prepakt, Inc., whose methods and materials are covered by U. S. Patents Nos. 2313110, 2655004, 2434302 and others, also patents pending.





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For over 60 years we have provided foundations for the structures of America, and the popular Raymond Standard Pile is just one of the many supports we have developed during this time. Furthermore, our experience includes complete construction services abroad, so we are familiar with your problems. May we apply our knowledge to your next foundation project? For further information write: 140 Cedar Street, New York 6, or one of our Branch Offices across the country, or our subsidiaries in Canada, Central and South America.

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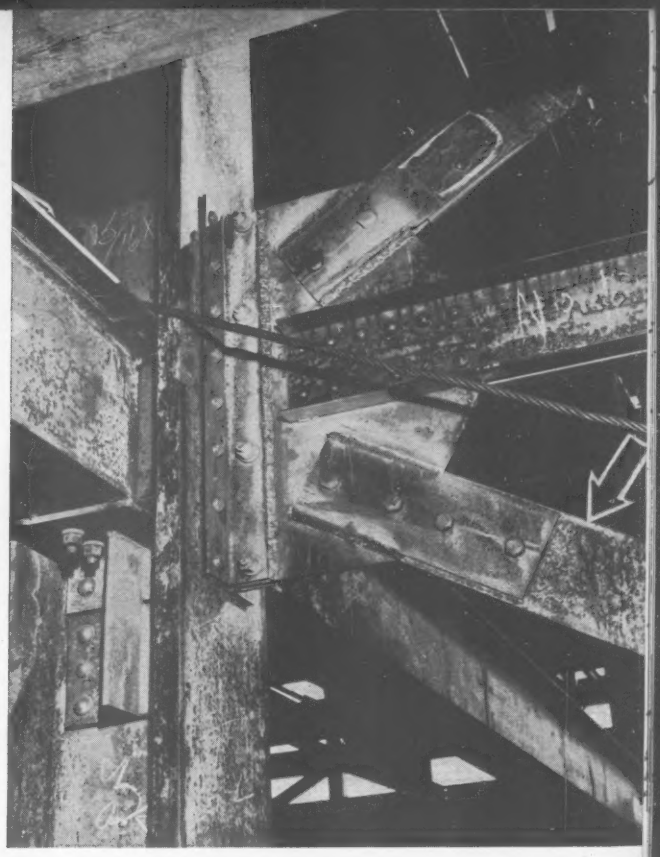


The Queen Elizabeth Hotel, Montreal, had to be braced against wind by installing prestressed steel diagonals (arrow) because of the narrow width of the tower section and the shallow floor beams in the tower rooms.

Prestressed Bars Wind-Brace New Hotel

The combination of narrow width, architectural requirements and unusual framing of the tower section of the new Queen Elizabeth Hotel in Montreal prevented standard methods of bracing from being employed to take wind loads on the structure. Therefore, pretensioned diagonal steel bars were placed in two bays of the three-bay-wide wings of the L-shaped tower, to provide the stiffness required.

The Queen Elizabeth, key structure in the Canadian National Railway's development plan for its 23 acre terminal area in downtown Montreal (ENR Oct. 7, p. 44) is 21 stories high and has three levels below ground. It is set in part over the tracks and platforms of the CNR terminal station.

Designed primarily as a convention hotel, it contains 1,200 bedrooms, and all public rooms are located in the three-story rectangular base of the structure. All bedrooms are located in the L-shaped tower.

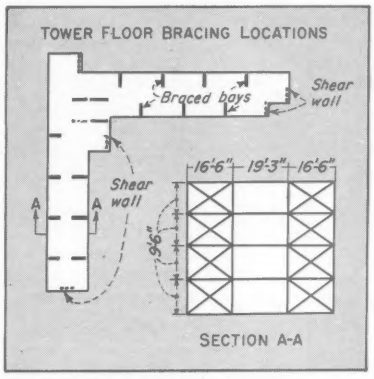
• **Tower framing**—The need for duct spaces prevented column-to-girder connections in the middle bay of the tower. Instead, floorbeams on each side of the columns connect to the longitudinal girders. This lack of a continuous tie between columns required that in design for wind loading in the narrow direction, the tower be considered made up of two single-bay braced towers with an unbraced bay between, instead of one three-bay unit.

• **Bracing limitations** — Architectural considerations limited the depth of beams in the ceilings of the tower rooms to 10 in. The shallow depth of these beams ruled out standard moment connections.

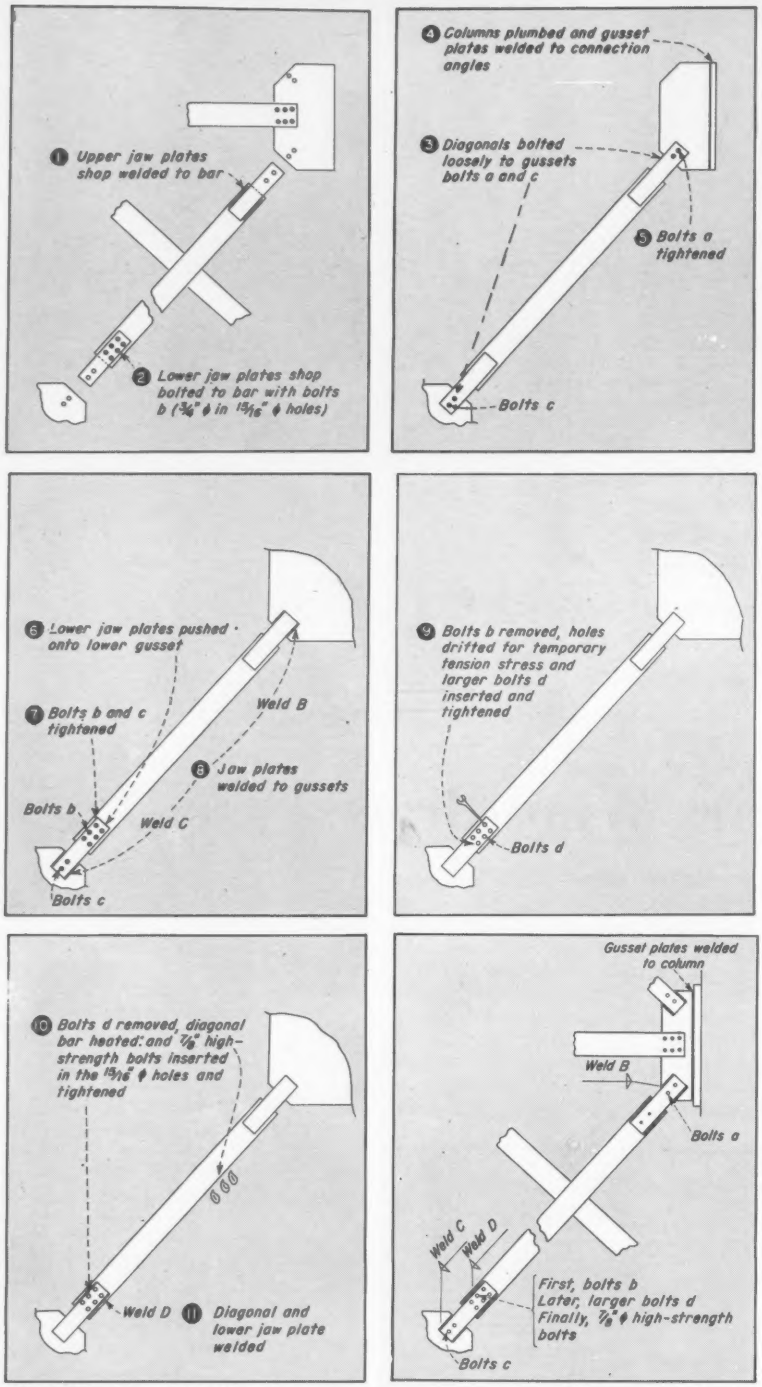
Concrete shear walls were considered but finally discarded. Placing the concrete shear walls as the steel went up might have interfered with and delayed erection of the frame. Since the steel frame was not capable of supporting itself against wind during erection, the large amount of temporary bracing that would have been required convinced the designers to seek a permanent system of steel bracing that could be erected with the frame.

• **Prestressed diagonals** — The bracing system used consists of flat steel bars placed diagonally in the first and third bays of the tower. None were used in the center bay because of the interruption in the transverse beams between interior columns. The diagonals acted as temporary bracing during erection.

The flat bars vary in width from 6 to 8 in. and in thickness from $\frac{3}{4}$ to $\frac{7}{8}$ in. Each was fabricated with a pair of jaw plates welded to the upper end and with another pair of jaw plates bolted to the lower end with bolts "b" (see drawing, p. 34, step 1-2).



DIAGONAL BRACING is located in outer bays of three-bay-wide tower sections.


1 Upper jaw plates shop welded to bar
2 Lower jaw plates shop bolted to bar with bolts b (3/4" ϕ in 13/16" ϕ holes)
3 Diagonals bolted loosely to gussets bolts a and c
4 Columns plumbed and gusset plates welded to connection angles
5 Bolts a tightened
Bolts c
6 Lower jaw plates pushed onto lower gusset
7 Bolts b and c tightened
8 Jaw plates welded to gussets
Weld B
Weld C
Bolts b
Bolts c
9 Bolts b removed, holes drifted for temporary tension stress and larger bolts d inserted and tightened
Bolts d
10 Bolts d removed, diagonal bar heated; and 7/8" high-strength bolts inserted in the 15/16" ϕ holes and tightened
Weld D
11 Diagonal and lower jaw plate welded
Gusset plates welded to column
Weld B
Bolts a
Weld C
Weld D
First, bolts b
Later, larger bolts d
Finally, 7/8" ϕ high-strength bolts
Bolts c

BRACING BAR installation is shown in steps 1-8. In step 9, tension was induced temporarily as bracing for frame erection. Permanent stressing procedure is shown in steps 10-11. The major steps to complete stressing of the diagonal wind braces are summarized in the sketch at the bottom right.

The diagonals, as erection progressed, were connected loosely by bolts "a" and "c" to gussets, which had been shop connected to the floorbeams. After the columns were plumbed, the gussets were welded to connection angles on the columns, and bolts "a" tightened (steps 3-5).

The lower jaw plates were then pushed down onto the lower gusset as far as allowed by ¾ in. bolts "b" inserted in the 13/16 in. dia holes (step 6). Bolts "c" and "b" were tightened, and the jaw plates welded to the top and bottom gussets with welds "B" and "C" (steps 7-8). Tension was induced in the diagonals when bolts "b" were removed and the holes in the bar drifted as far as possible to line up the holes in the jaw plates, so that larger bolts "d" could be inserted and tightened (step 9). This gave the initial tension for temporary bracing during erection.

• **Permanent stressing**—Final stressing was not accomplished until the floor slab above the bay to be braced was in place. Both diagonals in each panel were tensioned at the same time and all the panels completed on one floor before the next floor bracing was started.

Bolts "d", inserted for the temporary bracing, were removed and the diagonals heated. Elongation of the bars as they heated up was carefully measured. When a predetermined elongation was reached, high-strength bolts were inserted and tightly bolted (step 10).

After the bars had cooled, elongation again was measured. Since the stress induced was proportional to the elongation, tension in the diagonals could be accurately checked.

When checking showed the correct stresses had been obtained, the lower jaw plates were welded (weld "D") to the diagonal bar and the bolts removed (step 11).

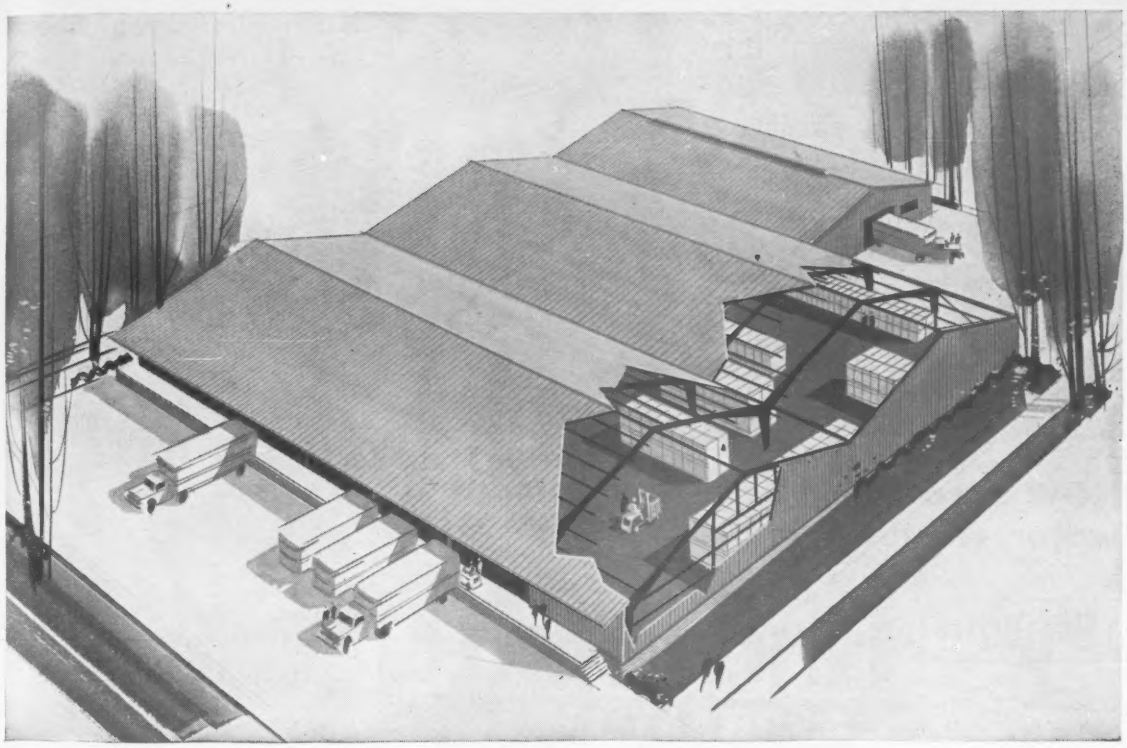
Tension developed in the diagonals was 16,000 psi. Column shortening due to increasing dead loads as floor slabs and equipment were added above reduced these stresses by 4,000 psi by the time the building was completed.

Of the remaining stress, 10,000 psi will be accounted for by maximum design wind loading. A residual stress of 2,000 psi will prevent the bars from going into compression. Since the diagonals are enclosed within thin partition walls, any buckling of the bars under compression would damage the walls.

Under maximum wind loading the tension stresses in each set of diagonals will be 22,000 and 2,000 psi, respectively.

Shear walls were used along the ends of the tower and around the outside of elevator shaftways in lower stories. In the base of the structure, where deeper beams were permitted, standard moment connections were used.

Below the fourth story the floors are 4 in. thick, one-way reinforced concrete



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. . . Prestressed wind braces

HOTEL (center rear) will ultimately face on the planned terminal plaza.

slabs with typical beam and girder connections. The tower floors are in general 6 in. thick, two-way slabs. Story heights are 9½ ft in the tower section, which has no hung ceilings.

• **Frame erection** — Erection of the frame proceeded without difficulty, except in the portion of the structure straddling the railroad tracks. To prevent interruption of railway traffic, only two of the twelve tracks could be taken out of operation at one time. This caused a delay of about three weeks between erection of every pair of column rows, since the floor slabs were placed only two panels at a time in this area.

• **Column cushions**—All columns were isolated from the foundation to prevent vibration from trains being transmitted into the structure. This was done by inserting vibration pads between the column bases and piers. The pads were made of two sheets of ⅜ in. asbestos cement separated by a 1/16 in. lead sheet.

Column bases were designed so that these pads were maintained under a compression of 800 to 1,000 psi. No anchor bolts were used.

The Queen Elizabeth Hotel is expected to be completed early in 1958 at a cost of about $20 million. It will be operated for the CNR by the Hilton Hotel chain under a long-term lease.

Architectural design and direction was done by the CNR architectural department, H. C. Greensides, chief architect. Steel was fabricated and erected by the Dominion Steel Co., Ltd., Lachine, Que. Pigott Construction Co., Montreal, is the general contractor.

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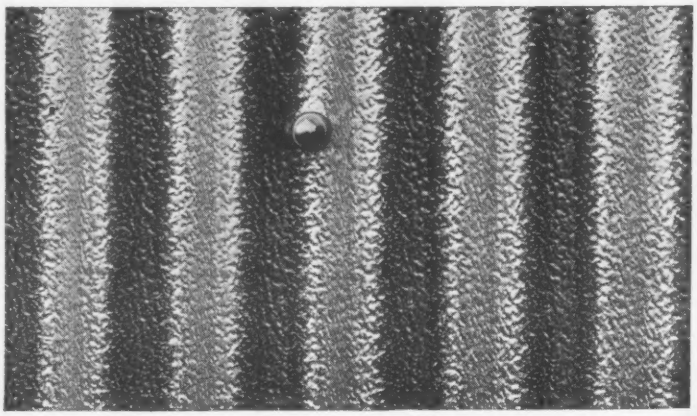

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Their cost—*installed*—averages only $1.20 to $1.50 per square foot!

Their high insulation value (U-Factor of less than 0.16 with 1" thick glass fiber insulation) reduces the load on heating and air-conditioning equipment—with reduced operating expenses for years to come.

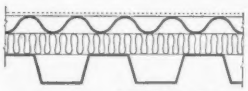
Their "sandwich" design permits easy fabrication in the field—at big savings in construction time and cost.

But that's only *part* of the many advantages you get with attractive new sandwich walls of Kaiser Aluminum.

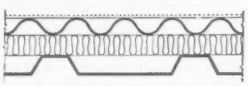
Their extreme light weight, for example, reduces dead load—effecting numerous savings throughout the building structure. Their thin construction (measuring as little as 2¾" thick) increases usable floor space. Their corrosion resistance—and the fact they never need painting—virtually eliminates maintenance costs.

There's never been a selection of sandwich walls more flexible or more functionally distinctive—at such low cost—than those made with Kaiser Aluminum siding sheets. For counsel, assistance and referral to expert sandwich wall applicators, contact the Kaiser Aluminum sales office listed in your phone directory. Or write Kaiser Aluminum & Chemical Sales, Inc., *General Sales Office*, Palmolive Bldg., Chicago 11, Illinois; *Executive Office*, Kaiser Bldg., Oakland 12, California.

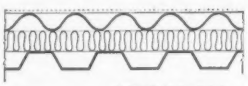
Choose From These and Other Sandwich Combinations



INNER SKIN: 0.024" Industrial Corrugated Siding
OUTER SKIN: 0.032" Ribbed Siding — 5.33" pitch



INNER SKIN: 0.024" Industrial Corrugated Siding
OUTER SKIN: 0.032" Ribbed Siding—8" pitch



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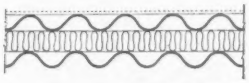
OUTER SKIN: 0.032" Ribbed Siding — 4" pitch



INNER SKIN: 0.024" Industrial Corrugated Siding
OUTER SKIN: 0.032" Industrial Corrugated Siding

KAISER ALUMINUM

THE BRIGHT STAR OF METALS

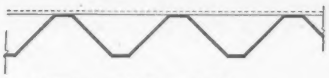
See **"MAVERICK."** Every Sunday evening, ABC Television Network. Consult your local TV listing.

A KAISER ALUMINUM ROOFING & SIDING SHEET FOR EVERY INDUSTRIAL NEED

INDUSTRIAL CORRUGATED ROOFING & SIDING

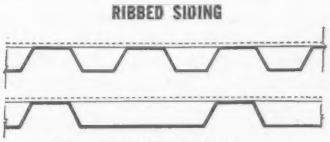
Thickness: 0.024" and 0.032"
Length: 5' to 12' in 6" increments
Siding Width: 33¾" and 47⅛" overall
Roofing Width: 35" and 48⅜" overall
Corrugation: ⅞" deep — 2.67" pitch
Finish: Plain Mill and Stucco Embossed

V-BEAM ROOFING & SIDING



Thickness: 0.040" and 0.051"
Length: 5' to 22' in 6" increments and 22'-5"
Width: 41¼" overall
V-Configuration: 1¾" deep—4⅞" pitch
Finish: Stucco Embossed

RIBBED SIDING



Thickness: 0.032" and 0.040"
Length: 5' to 22' in 6" increments and 22'-5"
Width: 41⅝" overall
Rib Configuration: 1" deep—4" and 8" pitch
Finish: Stucco Embossed

Also available with rib configuration 1½" deep—5.33" pitch. Sheet thickness 0.032", lengths 5' to 12' in 6" increments. Other specifications on request.

FLAT SHEET ROOFING & SIDING

Thickness: 0.024" and 0.032"
Finish: Plain Mill and Stucco Embossed

Full specifications on request.

NOTE: Kaiser Aluminum also offers a complete selection of flashing sheet, formed flashing, closures and other accessory items for use in sandwich wall construction.

TO BUILD THIS billiard-table smooth, 20-in. thick, rigid concrete runway . . .

OUT OF THIS type of glacial deposit of [illegible] mixed

Engineers at Dow AFB in Maine had to learn . . .

A Lesson in How to Mak[illegible]

The construction story at Dow Air Force Base at Bangor, Maine, is a lesson in how to "make do" with poor materials—how to build a heavy, rigid runway on frost-susceptible subbase in an area where aggregate must be manufactured.

The answers worked out by the Air Force, Army's Corps of Engineers, and the contractor add up to one of the biggest construction stories of any year and a major contribution to the art and science of doing acceptable construction work under pressure of time and uncooperative natural circumstances.

And running parallel to these lessons is a construction operation geared to casting a concrete slab 15 and 19 in. in thickness with exacting smoothness tolerances, $\frac{1}{8}$ in. within 12 lin ft, longitudinally and transversely, extending for the full length of a runway that comprises 11,400 ft of portland cement concrete.

In order to present the full picture at Dow, it is first necessary to set the scene:

Located at the edge of the city of Bangor, the base is a World War II installation, built to serve the needs of a war and of aircraft that already seem hopelessly ancient and outmoded. In continuous use, however, the base has the conventional triangular pattern of asphalt-paved runways—the longest 7,400 ft—and most of its building are wooden structures, painfully reminiscent of War II to any veteran of that conflict.

Interestingly—as at several other airbases in the northeast—the airfield is used by both military and commercial aircraft; it doubles as the municipal airport for Bangor.

Even before the advent of the huge, jet-driven, long-range bombers that now are the principal arm of the Strategic Air Command, the field was outmoded by the increasingly bigger, more powerful and heavier propeller-driven aircraft the Air Force has used. The runways became more and more difficult to maintain under heavier wheel loads and more powerful machines. And they broke up under the impact and heat of the smaller jets.

Most important, the runways weren't nearly long enough. Presently used by a fleet of the Air Force's KC-97 tankers (much-modified B-29's), the longest runway barely provides a margin of safety for these heavy craft that are used to refuel the big jets high above the area. And there's no margin at all if a B-47 or one of the big, 400,000 lb, B-52's should have to make an emergency landing.

The answer had to be a new runway—much longer, much heavier and much smoother than those now available. Another answer—now being translated into reality to the tune of some $6 million—was to build permanent structures at the base for housing personnel and equipment.

But the big story is the runway itself.

• **Long and smooth**—There's a very good reason—from the Air Force's point of view—for the extreme smoothness now being required.

As a multi-mission base, Dow must be able to accommodate all sizes of aircraft—from F-100 Series fighters to the heaviest bombers, from the supersonic planes with knife-like wings and the smallest possible landing gear to the B-52.

And in addition, the landing speeds of today's airplanes are so great that any roughness existing in the runway is magnified greatly, and transferred directly to the pilot's compartment.

The Strategic Air Command needed

d mixed soils . . .

FOR PLANES LIKE THIS 400,000 lb B-52 bomber . . .

Good Use of Poor Materials

a runway to serve the Air Force's biggest jets—a runway 11,400 ft long with overrun and blast areas of 1,000 ft at either end, paved so smoothly as to minimize danger at high landing speeds.

(The prevailing winds, and the ability of modern aircraft to land crosswind if necessary, had done away with the necessity for more than one runway at Dow.)

This runway must be capable of handling "gear loads" (the front landing gear of the aircraft is usually four wheels for the big planes) ranging to 240,000 lb. that are carried on high pressure tires.

It must be wide enough to provide safety for the 185 ft wingspread of the B-52, and for even bigger aircraft that may come off the drawing boards. Hence, it must have a 300 ft wide rigid concrete surface, with seeded, stabilized shoulders.

And it must be served by a taxi strip equally heavy, composed of a 75 ft wide concrete pavement, flanked by asphalt-stabilized shoulders that measure 50 ft in width.

• **How to do it**—The Corps of Engineers, acting as construction agency for the Air Force, proceeded with designs for the runway that have become standard for air base installations of this sort.

Mindful of the extremely cold weather that is common in the area, it called for an average of 47 in. of gravel base and subbase, compacted to 95-100%, to provide foundation for the concrete slab. The slab itself would vary in thickness from 15 in. at edges to 19 in. at the center, be of unreinforced concrete designed for 700 psi flexural strength at 90 days.

And the general design would include some new concepts in both runway lighting and turn-off ramps—in line with the Air Force's designation as testing agent on these matters for the Department of Defense, Civil Aeronautics Authority and other governmental departments.

• **Theory**—With these basic criteria established, a contract for $10.5 million (since raised to $11.9 million) was let to Joseph R. Cianchette, of Pittsfield, Maine, and work was started in the spring of 1956 on fill for the runway and paving of a taxiway.

Both the engineers and the contractor, who have long been acquainted with the area in which they were working, were familiar with the problem that has proved to be the most difficult on the job.

Materials for fill and aggregate are scarce and hard to find.

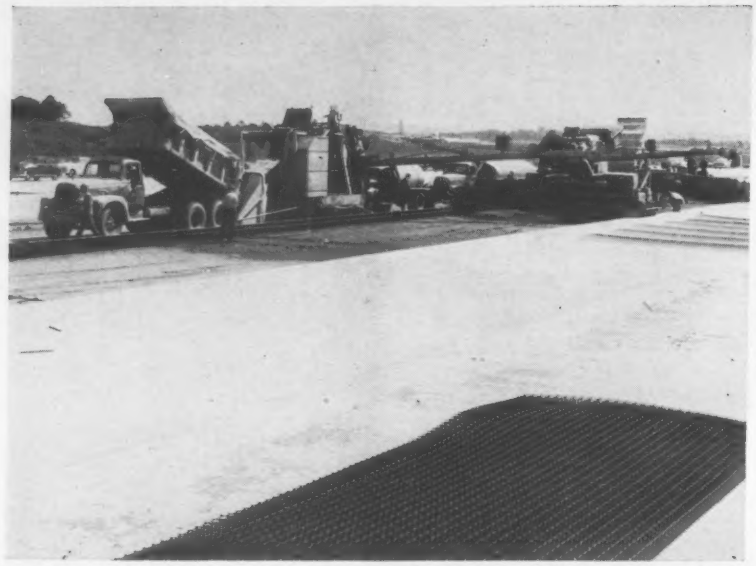
This area of the U. S. is characterized by widely varying rock and soil formations, the product of ages of slow upheavals and consolidations. All of it is overlain with glacial and sea-bottom deposits.

In such an area, dependable gravel sources are scarce. It exists only in widely scattered pockets left by the glaciers and must be sought out by drilling rigs and geologists. And a pit, once it has been found, can be worked out within a matter of days or a few weeks at the most.

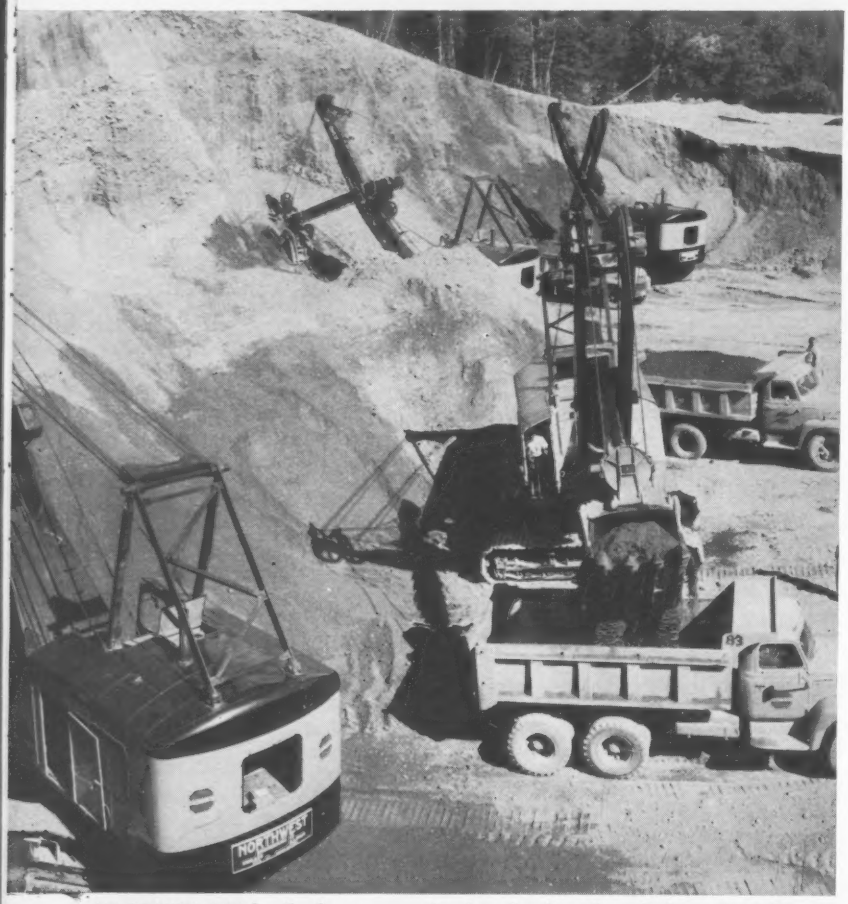
By the same token, aggregate for concrete is also difficult to come by. At Dow, it was decided to manufacture it completely, beginning with washing the natural sand and going right through to crushing quarried rock to desired sizes.

• **And practice**—With all this laid down, Cianchette moved on the job with an impressive collection of machinery—all of it sparkling new—and began to move materials. He had to be mindful of the short construction season, which may shut down paying operations by the end of October and gravel fill and compac-

. . . Lesson in use of poor materials



PAVING TRAIN includes two pavers, two spreaders, screeds and hand operations to put down 25 ft slab, 19 in. thick. Spreaders and screeds here ride on rubber wheels.



AT GRAVEL PIT 8 miles from runway site, four shovels perform dual operation. Because of poor material, two of these shovels strip face. Two others load trucks.

tion by November—at the very latest.

Signs of trouble with the material began to appear—elsewhere on the work—but in sufficient time to give warning and cause a complete recasting of the methods being used.

The trouble turned up in a 35-acre parking apron, put down under another contract a year before. Built to the same specifications as the runway, the apron slabs began to evidence cracking as the spring thaw took the heavy frost out of the ground. The cracks occurred at random in about 10% of the slabs.

Why did it crack? The engineers halted runway work while they found out.

What they found was interesting—but potentially dangerous and expensive.

It was this:

The gravel used for the compacted base appeared to be the source of trouble. At best, this gravel contains considerable fines. Silt and clay strata occur at random in all the pits of any magnitude. The material, as placed on the job, although marginal, met the tests for frost susceptibility (less than 3% finer than 0.02 mm. It also measured up to all the specified pre-compaction tests.

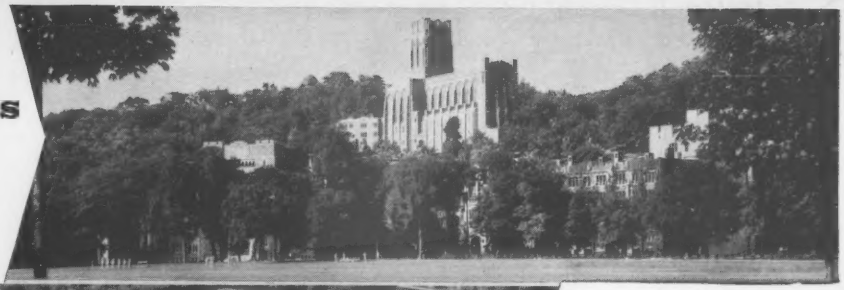
But more detailed study revealed that some of this "gravel" was composed of what appeared to be sound, round particles. Dug out of the pits, these particles appeared to be as hard as any other stone. However, during the process of compaction and exposure to weather and pressures, these "stones" crumbled away to a fine dust—the gravel became down graded, in effect.

Worse, this occurred in some areas as pockets of fines which acted like sponges in the fall weather, soaking up moisture from the rest of the area. And so, when heavy frost set in, it appeared as lumps throughout the base material, resulting in uneven pressures under the slab.

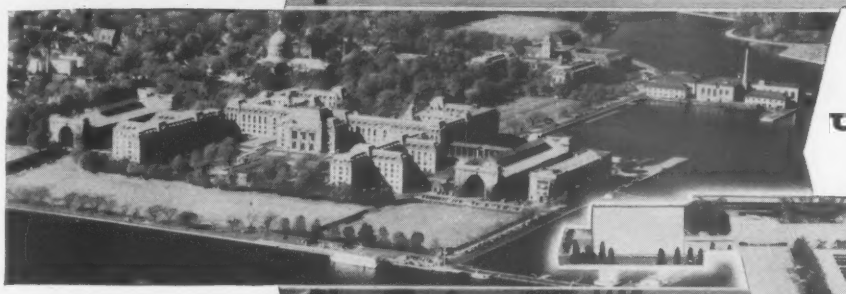
• **What to do?**—Faced with this problem and the need to complete the runway as soon as possible—plus the fact that more suitable material just isn't available for literally hundreds of miles from the site—the engineers and the contractor worked out a plan in which:

The first step would be to make more detailed exploration of the pits, and a very thorough mix of the gravel at the pits, before it was trucked to the runway site.

The next step must be to distribute the material in relatively thin layers—6 in. lifts were finally determined as best—compacting each thin lift separately with light rubber-tired rollers. This action would reduce much of the material in size, and the fines would be distributed evenly throughout the fill, instead of causing troublesome lumps. Frost ac-



UNITED STATES MILITARY ACADEMY



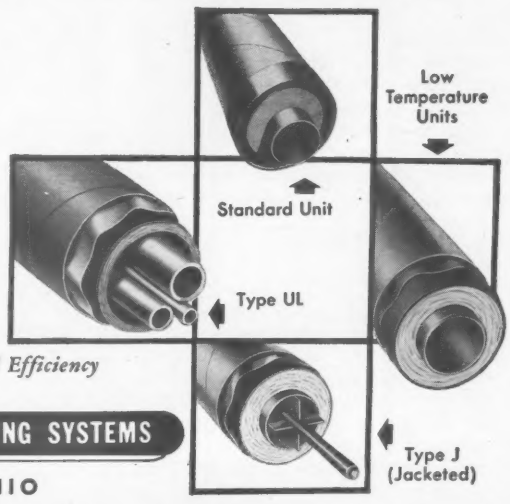
UNITED STATES NAVAL ACADEMY

UNITED STATES AIR FORCE ACADEMY

Photographs courtesy United States Military Academy, United States Naval Academy, and United States Air Force Academy.

Ric-wiL underground piping systems serve ALL three...West Point, Annapolis and NOW...the new Air Force Academy

West Point and Annapolis have been serviced by Ric-wiL piping systems as far back as 1931. Since 1946 alone over 15,000 feet of Ric-wiL prefabricated piping has been purchased for the nation's top military colleges. Installation of Ric-wiL piping at the new 17,500 acre United States Air Force Academy has already been installed. Ric-wiL is indeed proud of the part they have played in serving these military academies for a period of over twenty-five years.



Quality Piping Systems . . .
. . . of Exceptionally High Thermal Efficiency
SINCE 1910

RIC-WIL INCORPORATED — PREFABRICATED INSULATED PIPING SYSTEMS

BARBERTON, OHIO

IN CANADA: THE RIC-WIL COMPANY OF CANADA LIMITED

FORM ALIGNMENT has to be as nearly perfect as man can make it, to provide track for machines that must meet exacting smoothness tolerances.

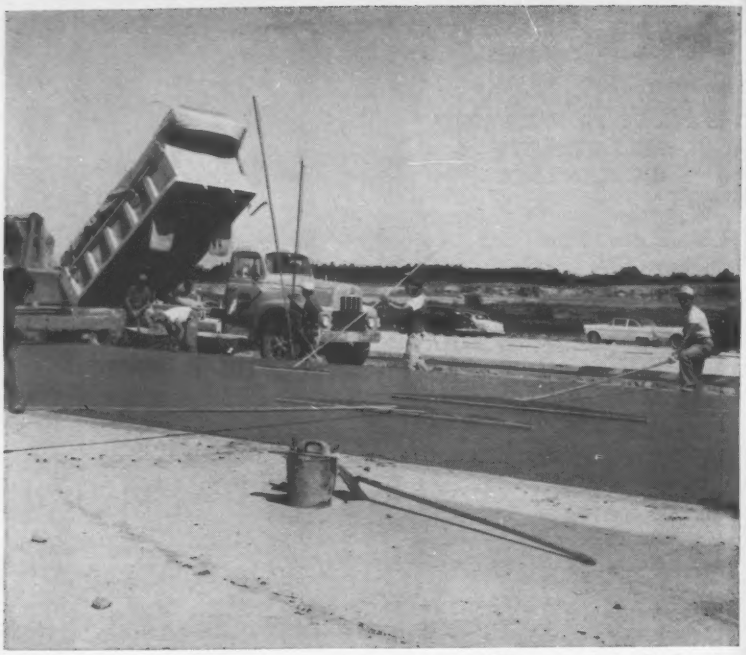
tion might occur—but it would then occur in sheets, rather than in pockets, and would exercise a uniform pressure on the overlying slab.

The final step in the plan was to use reinforcing steel in the center 100 ft width of the runway and in the entire width for the first 400 ft at each end. This was to be done to control any possible cracking of the slab that might occur even though great care was to be taken in placing the subbase.

In addition, while the side lanes were to be put down and sawed into smaller squares (12½ ft x 12½ ft); the four center lanes, each 25 ft wide, would be put down with joints only at 50 to 60 ft intervals.

A board of top civilian consultants aided in arriving at the findings and the planned steps to be followed.

When the contractor resumed operations again in late spring this year, his first move was to pick up and re-distribute something over 200,000 cu yd of subbase that had been placed in the previous year. This material had been placed in the originally specified 18 in. lifts and now was redistributed over the whole area of the runway in 6 in. lifts, each lift being compacted by rubber-tired rollers.

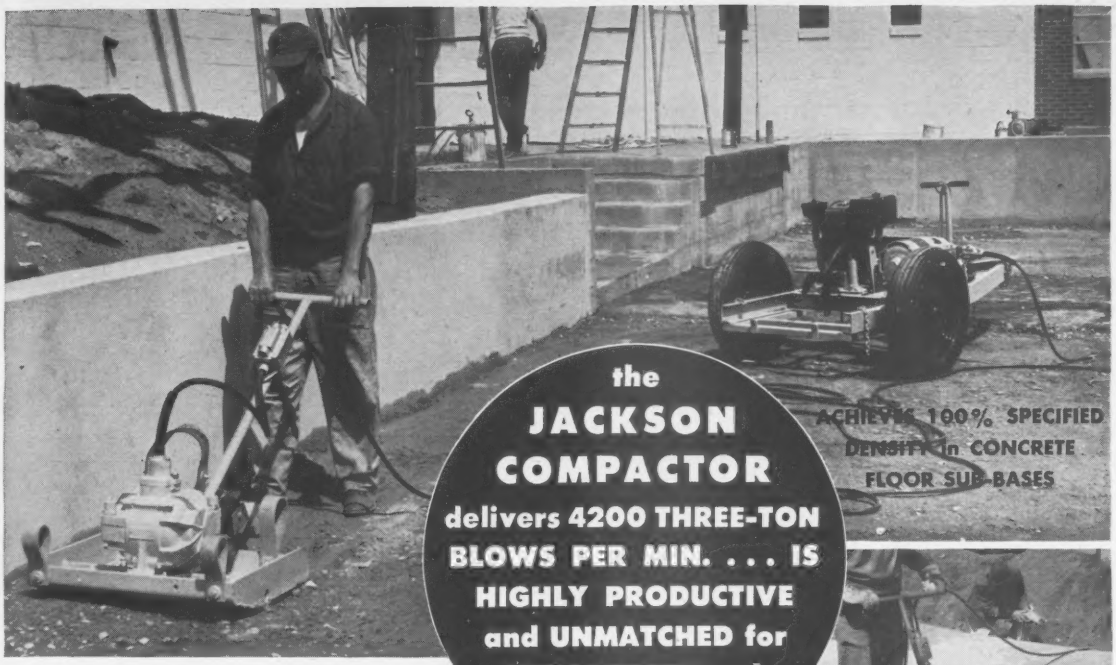


SPECIAL aluminum ball-floats are next-to-last step in finishing operation. Burlap drag and curing compound follow.

WHEELED RIG CHECKS TOLERANCES—Center wheel can move with irregularities, indicating acceptable limits on scale. High spots must be ground down.

• **To work**—With the base and subbase still going in, the contractor went to work on paving the main runway (the north end of the taxi strip was paved a year ago).

The first step was to bring the fill up to grade—and by this is meant a grade so exact as to be billiard-table smooth—

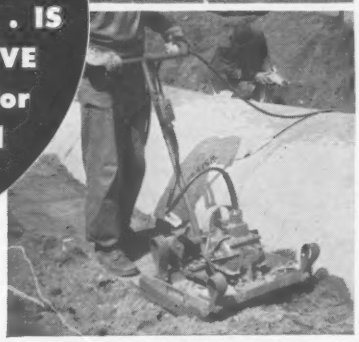


ACHIEVES 100% SPECIFIED DENSITY in CONCRETE FLOOR SUB-BASES

the JACKSON COMPACTOR

delivers 4200 THREE-TON BLOWS PER MIN. . . . IS HIGHLY PRODUCTIVE and UNMATCHED for VERSATILITY and CONVENIENCE!

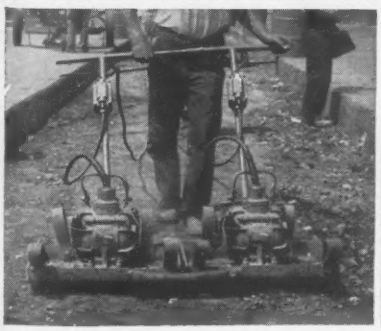
The JACKSON VIBRATORY COMPACTOR, together with a JACKSON auto-trailer-generator unit equipped to quickly pick up and lower the Compactor, is the handiest, most efficient and versatile outfit imaginable for compacting both granular soils and blacktop in an almost unlimited variety of applications. In granular soils 100% specified density is readily achieved in 6" to 8" layers at the rate of 600 sq. yds. per hour. 5" layers of bituminous mixes are also compacted close to maximum density at the same rate of production. And when a twin hookup is used, such as shown below, one man can easily double this production since the machines are self-propelling and need only be guided by the operator. (THE JACKSON IS THE ONLY COMPACTOR WHICH CAN BE USED IN TWIN HOOKUP.) Quickly interchangeable bases of 12" to 26" widths is another feature that adds to the great versatility of the JACKSON COMPACTOR. For consolidating sub-bases of concrete floors, bridge approaches, compacting in trenches, close to abutments, pavement widening sub-bases, patching and widening bituminous pavement and paving blacktop walks and drives this is the greatest money-making outfit you will discover anywhere. For rent or sale at your Jackson Distributor. His name and literature gladly sent on request. Write, NOW!



BACKFILL ▲▼ TRENCHES

JACKSON VIBRATORS INC. LUDINGTON, MICHIGAN

TWIN UNIT DOUBLES PRODUCTION



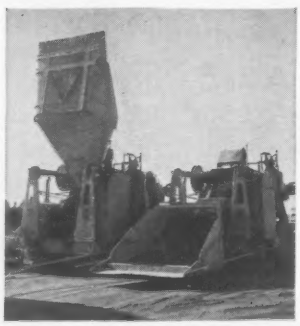
PAVEMENT PATCHING

PAVING DRIVES and WALKS

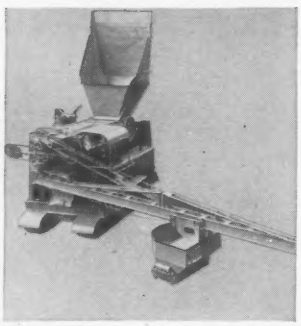
WORTHINGTON DUAL DRUM PAVEMASTER on the job for Detroit Contractor Thomas E. Currie Co. This is one of two pavers that worked 59 days straight with no downtime.

PAVERS BEAT DEADLIN

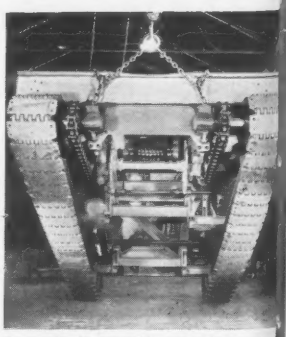
Hydraulic bucket control eliminates tedious hand spreading or the expense of a machine for certain types of projects.



Lightning fast charging. Skip travels from ground (right) to charging position of 56 degrees slope (left) in just 6½ seconds.



High bucket speed—256 feet per minute both forward and reverse—speeds operation, increases output on the new Pavemaster.



Rounded "cats" greatly reduc lug marks and gouges when tra eling and enable Thomas Curr Co. to work on finished paveme

93 BATCHES PER HOUR is Supervisor Cargill's average production. Hydraulically controlled boom with its fast, smooth swing assists operator in spreading concrete.

Equipment sold and serviced by J. R. Panelli Co., Detroit, Mich.

NBY 2 WEEKS

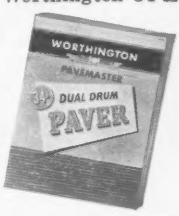
Two Worthington pavers operate 59 days straight without downtime to help contractor finish in time

tly redu
when tra
mas Curr
l paveme

Longer life for skip cables is assured by a new type fabricated steel bullwheel and hoist drum with grooves for cable travel.

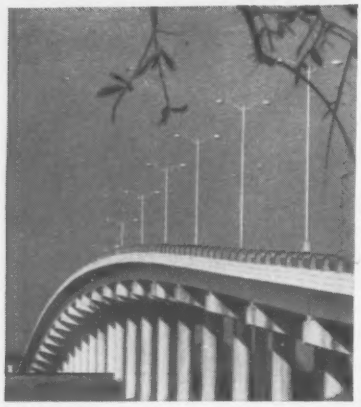
Weather trouble on a subdivision paving job put the Thomas E. Currie Co. of Detroit, Mich., three weeks behind schedule. "To catch up," said General Supervisor Glenn H. Cargill, "we ran our Worthington pavers 59 days straight. Not only did we make the deadline, but beat it by two full weeks. It's performance of that kind that makes new business an awful lot easier for us to get. In my opinion there's no other paver that can take it like a Worthington."

A respected name in Michigan contracting circles for the last 52 years, the Thomas Currie Company has used Worthington pavers for three decades. Says Mr. Cargill, "I highly recommend them to the contractor who wants maximum production with a minimum of downtime." On these two pages are some of the features of the new Worthington 34-E Dual Drum Pavemasters that Supervisor Cargill pointed out for special comment.



For your copy of this 28-page Pavemaster bulletin, please write to Section R-74, Worthington Corporation, Plainfield, N. J. Ask for Bulletin 1270-B1.

WORTHINGTON



VOSS

"SORBTEX"
BRIDGE PADS

These Preformed Pads answer every requirement for vibration and shock damping on highway and railroad bridges of all types — especially in prestressed concrete girder construction.

Voss "SORBTEX" Bridge Pads are precision-made of the finest materials, carefully selected to provide the most efficient performance under the most rigorous conditions. They meet all Federal, State, County and Municipal specifications, including mildew-inhibition. They are being supplied on such jobs as the Northern Illinois Toll Highway Project, involving more than 200 bridges.

Specify Voss "SORBTEX" Pads for your next bridge project, and be sure of complete satisfaction. Under girders, the true compressibility of "SORBTEX" assures pre-calculated permanent set, with limited deflection due to creep, under extreme live or dead loading; and assists in leveling. Under aluminum hand rails and lamp standards, the pads prevent electrolysis. They are available in a full range of plies and thicknesses in the dimensions you require — at economical costs.

Check these important advantages:

- High Resilience • Toughness • Strength
- True Compressibility • Long-Life Efficiency
- Exceptional Stability, Calculated Deflection, under Maximum Loading
- Broad Temperature Resistance
- Excellent Insulation Qualities
- High Water, Brine, Fungus Resistance

Send for samples and data today!

PREFORMED PAD DIVISION

VOSS BELTING & SPECIALTY CO.

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Materials Lesson at Dow AFB

MOUNTAINS OF AGGREGATE, manufactured in contractors' own quarry and crushing operation, are ready for concrete batcher in distance.

with scrapers and the rubber-tired, self-propelled rollers.

Then, taking line and grade from stakes provided by the Corps of Engineers, steel side forms were laid in with transit and tape to a standard far superior to any ordinary paving job, because the final paving will depend, in great part, on the accuracy of the placing of the forms.

Riding on and alongside these forms was then assembled what is certainly one of the most complex trains of paving equipment ever put together: Three 1½ cu yd pavers served by a tank truck each two spreaders, three screeds, a drag, men with aluminum bull floats and a spraying machine. All are attended by a constant flow of batch trucks feeding the pavers, a crane handling the reinforcing mesh, rubber-tired rollers working in front of the pavers. On other sections of the same job, the big trucks haul fill material in from (at present) an 8 mi trip from the pits, dumping their loads for the graders and dozers to spread.

Under the watchful eye of Paul Susi, Cianchette's job superintendent, the train works this way:

The first two pavers work in echelon formation, putting down the first 12 in. lift of concrete. The first spreader follows the two pavers to distribute the material—using its built-in vibrator bar to insure a compact slab.

Immediately behind the spreader, workmen aided by the crane place the reinforcing mesh.

The third paver follows to put down the final course of concrete, and is followed in turn by the spreader and horizontal and longitudinal screeds. The bull-floats follow, then the burlap drag, and last, the spraying rig to lay down a commercial curing compound.

All of the rigs that ride the forms were specially built for the job, to meet the needs of casting a 25 ft wide slab, and to allow for extra-fine adjustments to meet the exacting tolerance requirements. Dowel cages are set in between the forms before concreting, and the joints are sawed about 6 hours after the paving has been completed.

• **Results**—The aggregate used in the concrete ranges downward from 2½ in. stones to fines passing a No. 100 screen. The largest percentage of the coarse aggregate is in the 2 in. range; the largest percentage of the fine aggregate will be retained on a No. 50 screen.

The mix is designed for 700 psi flexural strength at 90 days.

The results of the extremely careful placing of the base and forms, and the fine adjustments of the spreaders and screeds, is a remarkably close adherence to the tolerances. After the concrete has achieved its initial set, the smoothness is checked by a three-wheeled "walking straightedge", whose center wheel is attached to a dial set to show acceptable limits. Spots showing as too high are marked with a dab of paint, to be ground down later. Considering the great size of the installation, comparatively little grinding has been necessary.

The whole contract held by Cianchette calls for a total of 218,000 cu yd of concrete in the taxiway and the

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★ **Five front ends, easily converted,** provide dependable versatility for a variety of excavating and crane work.

★ **Unit assemblies,** designed for easy replacement or quick service, minimize down-time and maintenance costs.

★ **Ball bearing swing circle** plus use of anti-friction bearings to mount all moving parts on revolving frame assure long wearability.

★ **Nylon pins and bushings** in operating lever system eliminate need for lubrication. In addition, all gears and pinions in main machinery (except the swing pinion and rack) are enclosed and run in oil.

★ **Long range hoe front end** for a ⅜-yd. machine provides extra reach. New type pitch brace attachment automatically changes dipper pitch for best digging and dumping angles.

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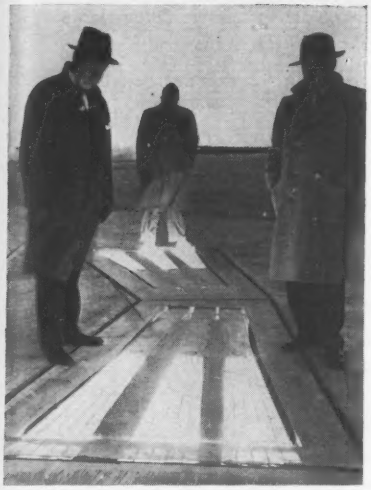
. . . Materials lesson



"ELFAKA" LIGHTING SYSTEM, is part of experiments with approach lighting.

runway itself (and 629,000 cu yd of base and subbase material to be placed).

Up to the last two weeks, when weather shut down paving (after 7,700 ft had been completed) the contractor has easily met an average of 1,400 cu ft of paving put down daily, and sometimes has reached a total of 2,000 cu yd placed in one day.

• **How to do it**—To achieve this record, Cianchette works a shift that begins at 8 a.m. and may run to 8 pm, depending on weather and delivery of materials.

Rather amazingly, for modern contracting, the job doesn't shut down even for lunch—the men eat at their posts on their machines or relieve each other for brief periods in order to keep the paving train in continuous operation. Contractor-employed engineers, geologists and other specialists keep constant check on materials, compliance with specifications and line and grade while also hunting out sources of gravel and aggregate.

To support the operation the contractor has mobilized a really tremendous list of equipment. It includes: 36 10 cu yd trucks; six 7 cu yd trucks; three 22 ton rock trucks; six truck mixers; eight carrying scrapers; two tractor-shovels; three rubber-tired dozers; three pavers; three 25 ton truck cranes; three 2½ cu yd shovels and one 1½ cu yd shovel; one 1¾ cu yd clamshell; four ¾ cu yd backhoes; two rubber-tired compactors; four graders; 19 tractors and dozers. And, of course, there are innumerable small tools and the complete sand washing plant, batch plant, quarrying equipment and asphalt plant.

• **Lighting**—Beyond the problems of the paving and subbase, Dow also will be the scene of experiments in lighting and in runway design that may have a profound effect on civil as well as military airport design.

Acting as agent for the Department of Defense and for civilian aviation branches of the government, the Air Force will install three separate systems of runway lighting in the approach area and the first 3,000 ft of the south end of the runway.

Principal element will be the Dutch-developed "Elfaka" system of lighting, which will provide an actual flight path down the centerline of the runway. The lighting units—to be placed in line, three on either side of the runway at intervals of 100 ft—are shaped like a duck's foot, broad at the toes, narrow at the heels. The broad end is in fact an open pit, covered by steel grillage, with the lighting units shining into it from the narrow end, which is covered. The effect, from the air, is to give a "toed in" path of lights marking the center of the runway. (The plane's wheel can pass directly over the lighting units embedded in the pavement.

Also, in the same section, a modified system of the Air Force's elevated approach lights are to be placed in rows of two lights at each edge of the runway, for a distance of 1,000 ft.

A third experimental installation will be a series of stroboscopic flashing lights within the "Elfaka" units.

The various systems will be controlled by circuits so arranged that any of the lights can be operated separately, or in combination with others. The object is to determine which system gives the inbound pilot the best guide to the runway, from the point of final approach until his wheels touch ground.

Also under consideration by the Air Force is the design of turnoffs from the runway that will permit landing planes to get off the main landing area without appreciably reducing their speed. Since the newest of the bases—like Dow—have only a single runway, the problem of clearing the runway rapidly, so that following planes can be brought in for landing in quick succession, is important.

Under consideration are taxi-strips designed like ramps on a high-speed highway, leaving the main road at a very gradual angle and possibly even super-elevated to accommodate high speed movement.

• **Credits**—Col. Roland H. Cipolla, Air Force Regional Representative for the New England Region, represents the Air Force on the work at Dow. Engineering and construction is being conducted under Brig. Gen. Alden K. Sibley, division engineer, New England Division. Maj. William Falck has been area engineer, and Alvin L. Heald is resident engineer at the base.

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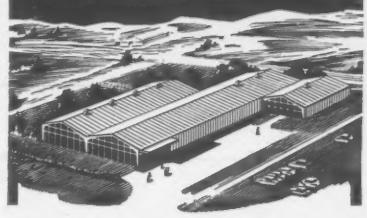

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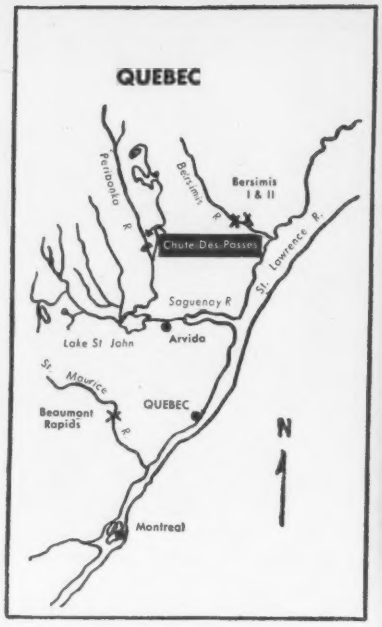
IT'S ROUGH COUNTRY where the Peribonka River flows below Passes Dangereuse.



QUEBEC'S NORTH SHORE is alive with hydro development: Bersimis, Rapide Beaumont, and now the exciting Chute-des-Passes.

Chute-des-Passes: Construction Drama

Arthur J. Fox, Jr.
Senior Editor

Just driving through the Quebec bush to this project is a thrilling experience—breathtaking scenery, 100 miles on gravel road. You finally show your identification at the barrier near Passes Dangereuse, and you are there—at Chute des Passes, where Alcan is mining horsepower from some of the oldest rock in the world, where a 1 million hp powerhouse is going underground.

You check in with Alcan's Jack Liddle, meet Perini's Don Duncan, and take off with them for the nearby powerhouse adit.

Inside you meet Marion Brown, super on this major phase. He makes it all sound simple and matter-of-fact as his light searches the roof being bolted for rock questionable to his experienced eye. He shouts explanation of how he'll handle some 17 headings in this one adit, as a battery of line drills hammers out its deafening din.

Outside the rough-hewn cavern that will be the powerhouse, in the relative quiet of the busy access adit, you mention Clancy O'Dell's fine progress on the 44 mile West Delaware water supply tunnel for New York. "Why, those pinholes they call tunnels down there," scoffs the good-natured powerhouse super, "I get all stooped over every time I go in one of them—can't stand up for days for fear I'll hit my head!" You recall the 13 ft water tunnel, look up at the bolted rock some 20 ft overhead and recall that the cavern being carved for this powerhouse will have a 125 ft vertical inside dimension.

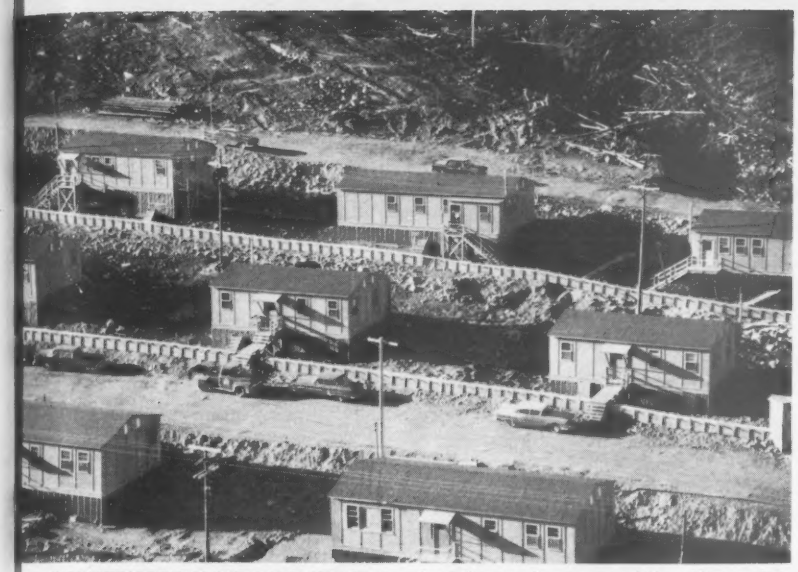
You take the front seat alongside Curley West, super at Adit No. 2, for a look at his work along the 6 mile power tunnel. And as he drives down the sloping adit to tunnel line, you size him up. The soft-spoken, hard-rock man from Texas has foremen and miners who follow him from job to job, they say, so great is his tunneling reputation.

He turns to the right in the power tunnel and goes but a few hundred feet when you meet the drill jumbo being hauled back from a loaded face, readied for a blast. Back past the adit in the opposite direction, you reach the other heading where scalers are finishing their work on the top of the jumbo, and drillers are unloading from a truck, preparing to go to work.

"Sure, they stay in here during the blast at the other heading," says Curley West. You see a grime-covered miner with fingers in his ears crouched against the tunnel wall, and you wonder what the blast will be like at such a close range.

Tunnel-man West faces his car

MINERS BEGAN a year ago on the 6½ mi power tunnel and the big, complex



CONSTRUCTION MEN MOVED IN to mine kilowatts from some of the oldest rock in the world, by dropping the river through a tunnel to a huge underground powerhouse.

toward the loaded heading, and you wait. It doesn't take long; they are ready for the shot.

But you aren't; it comes without warning.

Wham!!! Wham!! Wham!

Before you recover from the first blast that seems to have lifted the car from its springs, the shock wave has hit the heading behind you and come by in the opposite direction, with only slightly lessened intensity. Then it comes back at you from the blasted face again, and passes you again and again and again. Back and forth with the sound goes the light, a white flash riding the shock waves, up and down the tunnel, at you, then away—until at last there is only the dust and the loud ringing in your ears.

You've been in lots of tunnels. You've heard them blast before, but always from outside. You've always thrilled to the deafening roar of drills, you know the excitement of seeing water pour in streams from drill holes, you've watched a man dig in running sand in a soft-ground tunnel, and you know the noise of air coming from a decompression chamber in a pressure tunnel. But you haven't heard such a noise as this on a construction job. You can't help think of it but in terms of a half-dozen artillery pieces firing in quick succession, each just a little bit farther away.

You bid Curley West goodby and good luck and you wonder about the excitement of this day. You think of Kitimat and recall Bersimis, and every tunnel you've ever been in. You wonder how many have had this day's experience and you ponder how to share it. You think of the claims that kids are choosing the excitement of electronics in preference to staid old civil engineering. . . You chuckle at that one. . . You think of this whole Chute-des-Passes setup. . . You marvel again at the romance—and satisfaction—to be found on construction jobs. And you set out with renewed vigor to find the news in this one that every construction man should know.

Turn the page for more on Chute-des-Passes

powerhouse excavation where 1 million hp will be installed for aluminum production.

THE UNENDING PROCESS of drill-blast-muck goes on around the clock, six days a week, toward the first installation of power scheduled for August, 1959, at Chute-des-Passes.

Putting Hydro-power Underground

(*Story starts on p. 52*)

Miners at Chute-des-Passes, 300 miles north of Quebec City, paid little heed to the approach of winter last week as their job of digging in rock for hydro-power finished its first full year.

They seemed oblivious, too, to the fact that the million-horsepower underground installation they will finish for first power generation by August of '59 is now the most exciting of four big hydro jobs under construction in the Quebec bush on northshore tributaries of the St. Lawrence river.

To the east of their veritable rabbit-warren of big-bore tunnels is the even bigger Bersimis I, a 1.2 million hp underground plant nearing completion, and the 855,000 hp Bersimis II, started this year by the Quebec Hydro-Electric Power Commission. And to the west, in the less rugged valley of the St. Maurice River, Shawinigan Water & Power has its sizable Beaumont Rapids Dam readied for a winter's work.

(Features of Bersimis I and II and Beaumont Rapids are to be reported in subsequent issues.)

At Chute-des-Passes, the owner is Alcan (Aluminum Company of Canada), principal operating company of Aluminium Ltd., the same corporation that built underground power for aluminum smelting at Kitimat in British Columbia (ENR August 12, 1954 p. 32). The contractor for Alcan is a joint venture called Perini-McNamara-Quemont Construction Co., with Perini Quebec as the sponsoring firm.

And at Chute-des-Passes the $125 million assignment is this:

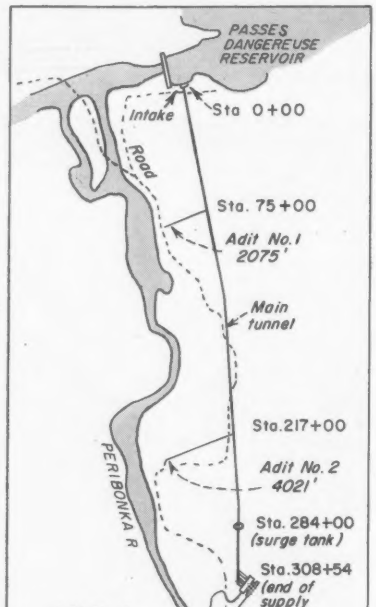
- Dig and line a 6 mi, 34 ft diameter power tunnel from the existing Passes Dangereuse Reservoir.
- Carve out a 465 x 70 x 70 ft chamber to house five big 200,000 hp hydroelectric units, world's biggest of their type (bigger than the present record holders, 165,000 hp units at Grand Coulee).
- Dig a tailrace manifold chamber of almost comparable dimensions.
- And tunnel a 48 ft diameter tailrace 9,000 ft back to the Peribonka River.

Bigness and remoteness distinguish all phases of this project. But one of the most intriguing features of all is the complex tunneling required just to get into the subterranean powerhouse itself, plus the penstock and tailrace manifolds either side. This maze of tunnels is shown in the accompanying perspective drawing of the powerhouse, as it will look (according to the artist) when completed. The access tunnel in this drawing is Adit No. 3 of the current construction project. This bore took miners to the powerhouse area where they began excavating at the roof level.

In the meantime, they looped around to the penstock manifold with one access line and to the tailrace tunnel line with another. Still another access bore which does not show in the drawing took the miners from the powerhouse to the tailrace manifold that parallels it.

All told, there will be a total of 17 headings working within Adit No. 3, seven of these to be vertical raises. One of the major vertical raises (not shown in the drawing) will be the shaft leading upward to the surge chamber, cut all the way to the ground surface at a point about 2,450 ft upstream from the penstock manifold.

Adits No. 1 and 2 (see map) are respectively 2,078 ft and 4,021 ft long, sloping access bores to the power tunnel line. Each leads to an upstream and a downstream heading.



TUNNEL LINE parallels river from existing control reservoir to the powerhouse cavern now being carved out of granite.

The rock in all three adits is generally good solid granite of the Laurentian Shield. It is a bit blocky within the 2,675 ft Adit No. 3—not seriously troublesome, but less ideal than the rock in the power tunnel at Adits No. 1 and 2.

- **It's all work**—In all these adits, tunnel crews work two shifts. They are actually working two 12 hour shifts, work goes around the clock.

Men come to such a remote project as this one to make and to save money. They want to work long hours; they have little use for leisure time. Paid for 11½ hours a day, six days a week, they get incentive pay based on progress. That they are making real progress is evident in claims of 771 ft in a week at four headings in the 38 ft dia (unlined) power tunnel last July.

A 33 truck fleet of rear dump trailers (highly touted on this job for their maneuverability in the tunnel) moves some 6,500 cu yd of muck from each tunnel heading per week. The top heading and bench method is used in these large horseshoe-shaped bores.

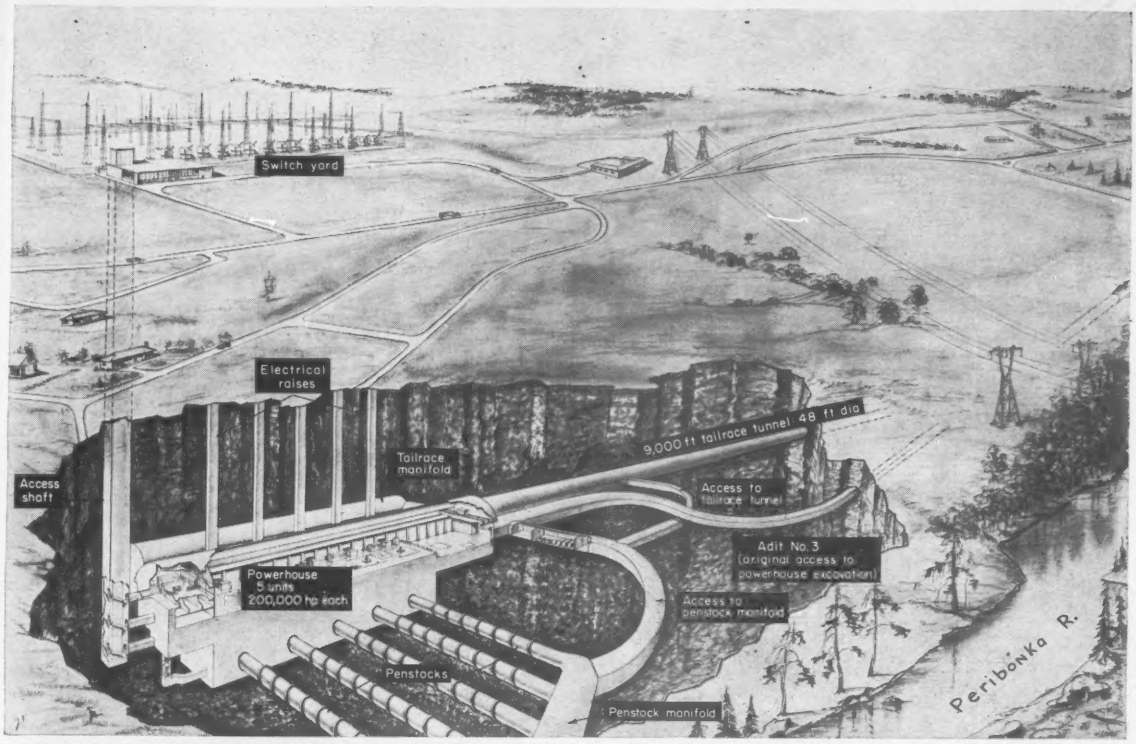
At each power tunnel face a jumbo fitted with 21 drills works the top heading. Excavation averages 33 cu yd per linear foot of advance. When it comes to excavating the bench, progress will be faster as only 15 cu yd per ft will be drilled, blasted and mucked.

Power tunnel driving ought to be finished next July 1, with concrete lining to be done April 1, 1959.

- **Big bores**—A truly big jumbo, for the 48 ft dia unlined tailrace tunnel, was completely fabricated in the contractor's yard and then cut in half to be dragged into the heading where it now works. It is a skid-mounted monster bristling with 20 drills (three levels with six each, plus two on top drilling roof-bolt holes).

All tunneling on this project makes selective use of roof bolts. In the big caverns that are to be the powerhouse and tailrace gallery, roof bolts are used extensively, generally on 4 ft centers, to safeguard the workers until roof arches are completely cast.

The excavated section in both powerhouse and tailrace gallery is a mushroom shape with broad benches, one on each side, from which roof arches spring. The construction procedure is to cast a hefty curb along each bench as foundations for the roof arch. Then the arch form is moved along for the



CHUTE-DES-PASSES POWERHOUSE should look like this some day. But today, Adit No. 3 leads to a rabbit-warren of tunnels, raises and chambers that have yet to take on this orderly appearance. The cleared land above is also a thing of the future.

reinforced concreting of 20 ft of roof at a time, roughly 2 ft thick.

Power during construction will come to the Chute-des-Passes project from a thrice-built hydroelectric plant. The 15,000 kva, two-unit kw four-unit plant —installed now at a temporary earth and rock dam across white waters of the Peribonka River—was previously installed for construction power at Hydro-Quebec's Bersimis I construction job (ENR Nov. 17, 1955 p. 34), and before being retired, it served for about 30 years as a permanent feature along the St. Lawrence river at St. Timothee.

For more than the first year of construction at Chute-des-Passes, before the temporary hydro electric station was on the line, a 10,000 hp diesel-electric plant put out the job's power supply. Now both are used.

• **Big force**—There are over 1,500 men on the Chute-des-Passes work, primarily engaged in tunneling. The project's total payroll runs to more nearly 2,000. Despite the hazardous nature of the work, the accident rate is low compared with other similar construction.

Construction management on the job begins with three tunnel superintendents of considerable reputation: U. S. (Shake) Hodgins in Adit No. 1, Curley West in Adit No. 2 and Marion Brown in No. 3, the powerhouse adit.

E. B. Fontaine is Perini's project manager for the whole $150 million worth of work. And Don Duncan, his assistant, was the tunnel super in Adit No. 3

BIG TUNNELS call for a long reach for scaling and roof bolting the rock.

through the early months on the project. D. C. Cannon, vice president of Perini Quebec is the managing officer of Perini-McNamara-Quemont Construction Companies, the joint venture. Frank T. Matthias is Alcan's director of engineering and construction; Gilbert Proulx is Alcan's project administrator for this job.

For Alcan, Jack Liddle is in charge of all on-site administration. Engineering, both on-site and off has been handled by H. G. Acres Co. of Niagara Falls, Ont., consultants to the Aluminum Company of Canada.

Chute-des-Passes, with its 1 million hp, will bring the total Aluminium Ltd. hydro-power installation in Canada to 4.87 million hp. It will be the sixth hydro installation built by Aluminium Ltd. on the Saguenay and Peribonka rivers. These power plants (Shipshaw, Chutes-a-Caron, Isle Maligne, Chute Savanne and Chute-du-Diable) are bolstered by storage dams at Manouan Lake and Passes Dangereuse, and they supply power to smelters at Isle Maligne and Arvida. The Arvida smelter is the world's largest.

Power at Chute-des-Passes will be produced from an 18,000 cfs flow of water dropping through a 540 ft operating head. Electricity will be carried to smelters on 345,000v class wire.

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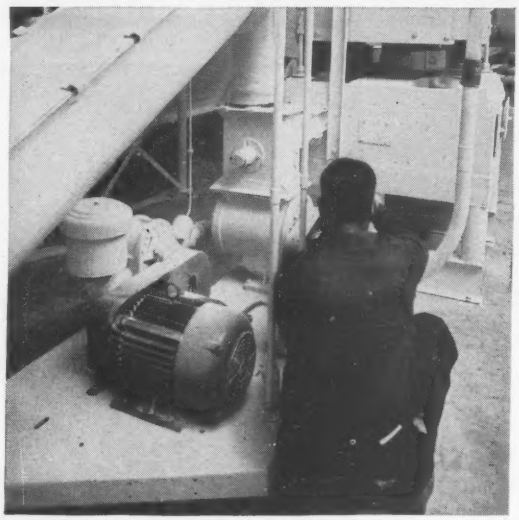
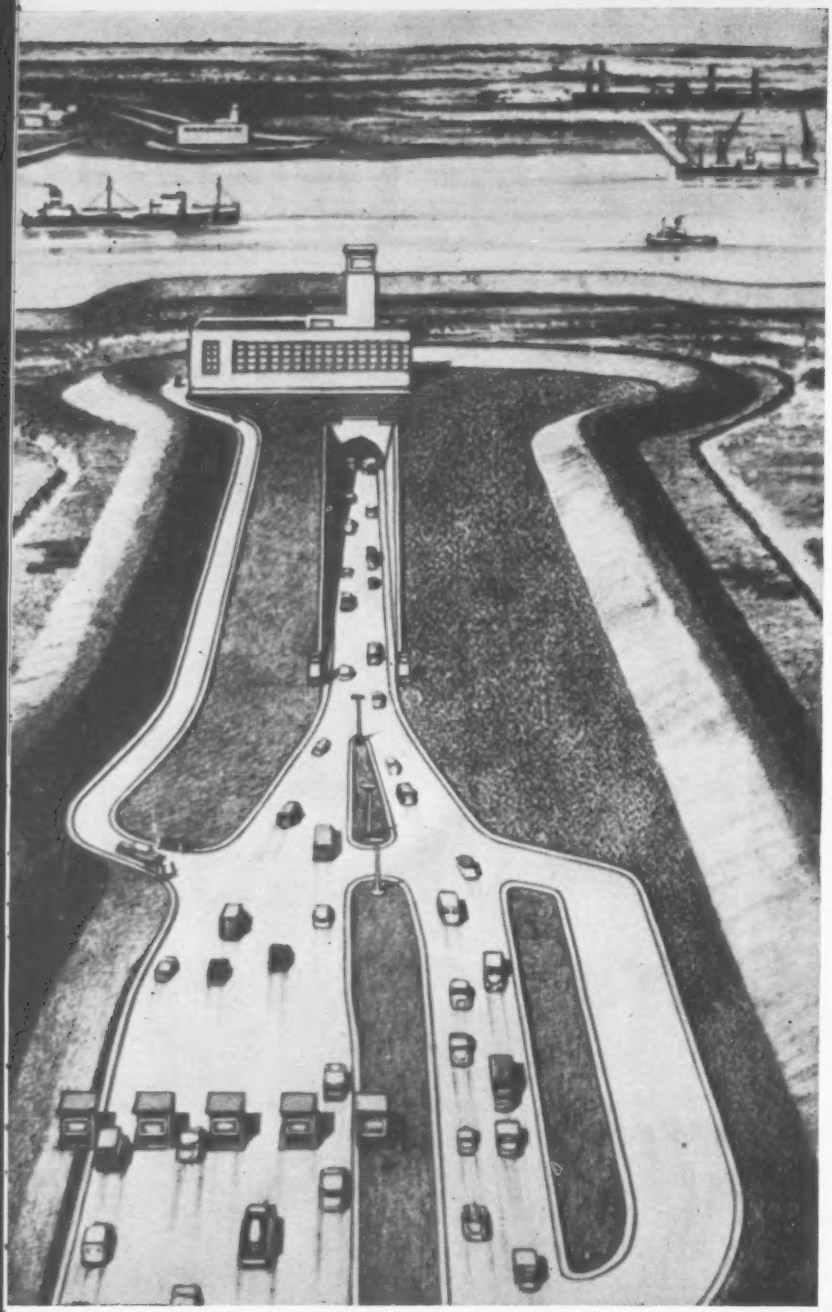


EXAMPLE: With the Life-Line® "A" motor, Westinghouse offers a *standard* motor engineered for an unusually wide range of applications. This includes many exacting requirements in the chemical, paper, steel and other industries commonly classified as "special." You get faster delivery from Westinghouse, right off the shelf, for most motor needs without custom costs.

EXAMPLE: Economy of space plus convenience are featured in this Westinghouse panelboard, designed to fit standard steel columns, yet provide ample switching and protective capacity. Allows convenient location of panels without special construction costs. Westinghouse Quicklag® breakers provide dependable protection for personnel and equipment with least "out time" in the event of line fault.

River Gravel So



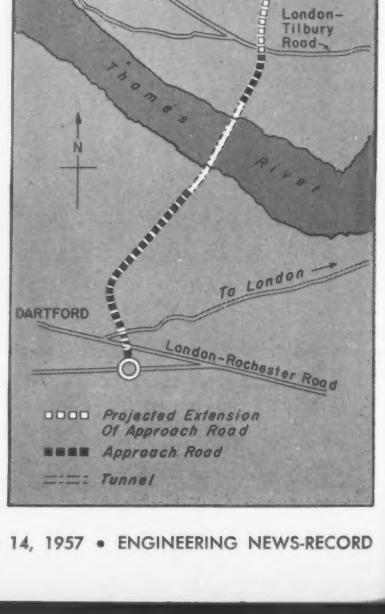
The Dartford Tunnel entrance as it will look when completed (above). The approach road cut is protected from the river flood water by dikes made up of excavated material from the boring operation. Toll booths are shown in the foreground and in the distance are the ventilation buildings.

An unusual method of solidifying a gravelly river bottom has made a smooth job of lining the almost one-mile-long Dartford Tunnel under the Thames River, in England.

It is planned to complete this $28 million vehicular project to link Kent and Essex counties by 1962. The reinforced concrete roadway will be 21 ft wide, carrying two lanes of traffic, and will have a 16 ft headroom at its curbs. The lowest point will be 100 ft below high-water.

• **Shield driven**—The 4,700 ft long main tunnel will be circular and cast-iron lined, the inside diameter being 28 ft 2 in. The structural lining of the tube will consist of flanged cast-iron segments, built up in rings, and varying between 1½ ft to 2½ ft in width, depending upon the type of ground to be supported. The flanges of the segments, which will be 14 in. deep and up to 2½ in. thick, will be bolted together with 1½ in. dia steel bolts—in a manner similar to the Lincoln and Brooklyn-Battery tunnels in New York. Some 260,000 bolts will be used.

As the cast iron lining is erected it will be grouted solidly into the ground by means of liquid cement injected under pressure. In order to make the tunnel watertight, the joints between the segments will be subsequently caulked with metallic lead, as in U.S. practice. Approximately 160 tons of lead will be used for this purpose, and a total length of 56 miles of joint will be treated.



TUNNEL ROUTE and its approach roads that link with roads to London at both West Thurrock and at Dartford.

Solidified for British Tunnel

The total weight of the iron castings in the lining will be some 34,000 tons.

The tunnel is being driven entirely in water-bearing ground, silt and gravel with chalk underlying. To keep out groundwater during construction, the boring operations are carried out under compressed air, behind a jack-driven shield.

Unlike recent U. S. practice, room to advance the two shields (one from each side of the river) will be cleared by men working in front of the 300 ton units.

Pneumatic spades will be used to attack the face from the cross-member cells of the shield. After disposing of an initial stratum of gravel, they will cut into the chalk, throwing the debris on conveyors which will take it to the back of each of the shields. Here it will be pulverized and mixed with water. The resulting slurry will be pumped through pipes to the surface, where it will be deposited to form dikes that will serve to hold back river flood water from the cut section in which the approach road is to be built.

When the whole face has been excavated a distance equal to the width of a ring of the cast-iron lining, the shield is moved forward, by a series of 42 hydraulic rams mounted peripherally inside the shield. These jacks bear on the last ring of the tunnel lining to have been erected, and push the shield bodily forward by the exact distance required to allow another ring of lining to be built after the hydraulic jacks are withdrawn. (In construction of New York's Lincoln Tunnel, the shield itself did the cutting, with part of the displaced material being admitted through portals in the shield to act as ballast and to be disposed of later.)

The hydraulic jacks are designed to operate at a maximum pressure of 6,000 psi. The shield can exert a total thrust of over 6,000 tons if required. The power for this is generated by electrically driven hydraulic pumps at two surface stations, one at each side of the river, and transmitted to the shields through hydraulic pipelines. A series of secondary hydraulic rams, operating at a lower working pressure, are used for supporting the tunnel face, and for other subsidiary purposes, including the hydraulic erectors, which lift the cast-iron segments as they are delivered at the rear of the shield and place them—each weighing one ton or more—in position for bolting up to the tunnel lining.

• **Slow start**—Before World War II, two of the shields for the main tunnel were erected in the shield chambers—short lengths of tunnel, 35 ft in dia—constructed at the Essex and Kent working sites. At the same time a pilot tunnel was driven.

After the first shield has been moved away from the chamber on the Kent side, a third shield will be erected in the same chamber, and driven in the landward direction towards the tunnel entrance. This shield will be driven up to a caisson, containing ventilation shafts, to be sunk into the mud of the Thames marsh at the site of the ventilation station, within about 300 ft of the tunnel portal. Here the third shield will be dismantled, and the remaining short length of the tunnel will be constructed in open excavation. A similar process will take place on the Essex side, but since the landward drive here is relatively short, it is possible that a shield will not be used.

The existing pilot tunnel, completed in 1938, will be dismantled as the under-river drives of the main shields progress. This tunnel is 12 ft ID and is situated inside the limits to be occupied by the lining of the main tunnel, mainly in the upper portion of the latter, so that the excavation for the main tunnel will, in effect, be an enlargement of the excavation already made for the pilot tunnel.

The pilot tunnel not only served the purpose of exploring the strata in advance of the main work, but also allowed treatment of difficult strata to be carried out.

• **Ground treatment**—Fissured and broken ground in the weathered zone at the top of the chalk already has been treated by the injection of portland cement grout, cementing the broken chalk to a distance of 5 ft outside the lining of the main tunnel. This work was carried out in 1938-39, from the 12 ft dia pilot tunnel.

Directly over the chalk lies the Thames gravel, from 5 to 15 ft thick, with varied layers of fine, medium, and coarse sand and gravel, and containing flint cobbles up to 3 in. Typical gravel of this sort, in which coarse and fine materials are distributed in irregular layers, has not been treated successfully with plain portland cement grout.

In this case, the "Solentanche" system of clay-cement grouting was used.

The principle of this method is that the voids in the alluvial material are sealed by the injection (in successive stages) of composite grouts designed to penetrate deposits of differing permeability. The main material employed is bentonite, a processed clay with a high liquid limit and thixotropic (can be made fluid by shaking) properties which permit it to penetrate soils in which the grain size is too small to admit a portland cement grout.

By combining bentonite in differing proportions with portland cement, and with soluble silicates and other reagents, it is possible to prepare grouting fluids suited to the particular characteristics of the ground as disclosed by sampling. The larger voids are filled first with a clay-cement grout. This is followed by a clay-chemical grout which penetrates the finer materials and renders it impermeable.

• **How to do it**—Grouting is carried out from ground level, through a series of vertical holes spaced at 10 ft intervals over the area to be treated. First, a cased borehole 3 in. or more in diameter is sunk to the bottom of the gravel at each point, using conventional methods. Inside this borehole is placed a sleeved injection tube consisting of a 1½ in. dia steel tube with groups of radial perforations arranged at intervals of about 12 in., each perforated section being covered by a flexible rubber sleeve that fits closely around the tube.

When the sleeved tube has been inserted, the 3 in. dia outer tube is withdrawn from the borehole, and simultaneously the space around the sleeved tube is completely filled with a special grout. It does not penetrate the ground, but forms a watertight plastic seal around the sleeved tube.

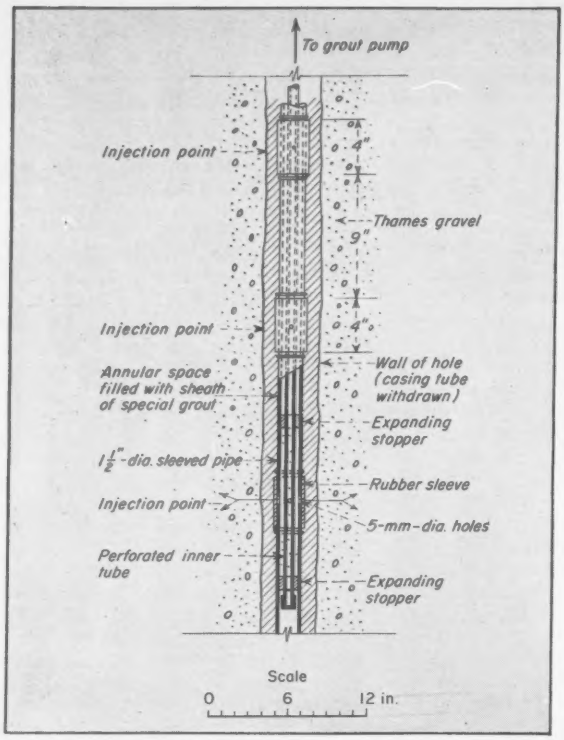
A 1 in. dia tube, connected by a flexible hose to the grout pump, is then inserted inside the larger outer tube.

The bottom end of the inner tube is closed, but its lower portion contains a short perforated section. Above and below this are expanding stoppers, which form a tight seal against the inner surface of the outer tube. By raising or lowering the inner tube, the perforated end can be placed opposite any of the sleeved perforations in the outer tube. When grouting fluid is pumped into the inner tube, it emerges into the space between the isolating stoppers, lifts the rubber sleeve and, rupturing the sheath of special filling surrounding the outer tube, it flows into the ground through the fissures.

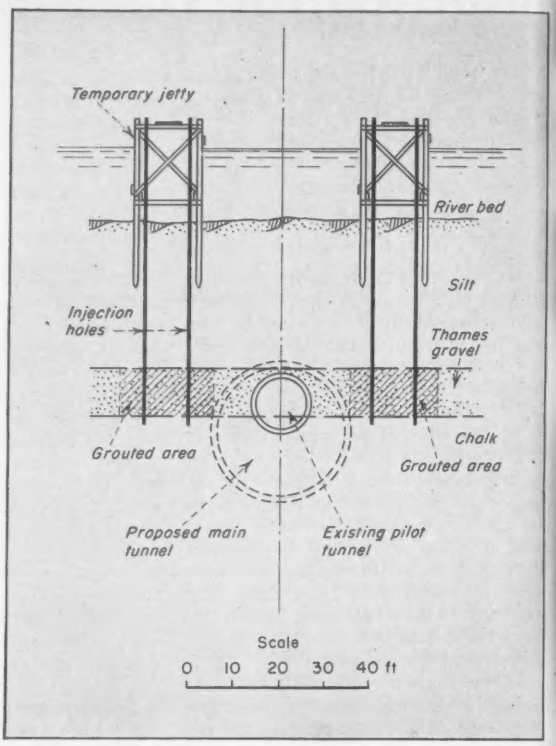
Normally, injections commence at the bottom of the gravel and proceed upwards. After injection, the inner tube is withdrawn and the sleeved tube is thoroughly washed out so that successive injections can be made.

Once the sleeved tubes have been installed in the ground, repeated applications of grouts of different characteristics can be made at any interval of time without the expense of re-boring. A further advantage is that separate injections can be made at short vertical intervals. The grout travels radially outwards from the injection tube at

. . . Gravel layers around Britain's Dartford Tunnel are treated with injected grout



SOLETANCHE GROUTING TUBE—is a sleeved injection tube, consisting of a 1½ in. dia tube with groups of radial perforations, covered by a flexible rubber sleeve.



TEMPORARY JETTIES are shown in the sketch, to be used as working platforms from which the injection tubes can be sunk and the grouting operation effected.

the chosen level, and this makes possible selective application suited to variations in the bedding.

• **Application of treatment**—Points at which open gravel occurs in the upper portion of the tunnel face are where the risk of excessive loss of compressed air during tunnelling is greatest, with the consequent danger of "blows" and difficulty in maintaining sufficient working pressure.

Where the gravel occurs at these levels, it is being grouted on each side of the tunnel to a distance of 20 ft, this width being considered necessary in order to obtain adequate protection against failure.

Where the gravel runs out above the face, the treated sections merge and continue as a single block extending to a point at which the bottom of the gravel is 5 ft above the tunnel.

Thus, the treatment will produce, in effect, a "box" in which compressed air entering the gravel exposed in the tunnel face will be contained between two walls of treated gravel and a ceiling and floor formed by the overlying silt and the chalk, both of which are relatively impermeable. This elongated "box" will be divided into sections by treating transverse blocks of gravel at intervals of 200 ft.

Part of the ground to be treated extends under the bed of the river. To provide working platforms from which the sinking of injection tubes and grouting operations may be carried on, two temporary timber-piled jetties are being built; one extends 400 ft into the river from the Essex shore.

• **Test made**—On the Kent side of the river, an area of approximately 40 sq ft was grouted—the gravel being about 10 ft thick. A 21 in. dia well was sunk in the center of the treated area and falling head tests were made, from which results the permeability of the grouted gravel was calculated.

An observation well was sunk at a distance of about 80 ft from the treated area in order to enable tidal variation of the natural ground water level to be recorded. A test demonstrating the order of permeability of the untreated gravel was also made in this well.

The results of the tests indicated that the clay-cement grouting had reduced the permeability from the order of 3×10^{-1} to 1×10^{-2} cm/sec in the natural state to 5×10^{-4} to 1×10^{-5} cm/sec when grouted.

• **Ventilation**—The tunnel will be ventilated by blower and exhaust fans located in the two ventilation buildings to be constructed a short distance from the tunnel entrances. Each ventilation station will be connected with the tunnel by two shafts of 14 ft dia for the fresh and exhaust air. The space under the roadways in the tunnel will be used as a main duct for the supply of fresh air, which will be delivered to the roadway area through a series of small side ducts behind the curbs. Vitiated air will be drawn from the tunnel through the exhaust shafts connected to the ceiling and discharged from the exhaust towers of the ventilation station. More than 600,000 cu ft of fresh air per minute will be required during peak traffic hours to keep the atmosphere safe. The fans for blowing and exhausting this large volume of air will be similar to types used in mining.

• **Builders**—Soil Mechanics Ltd., are responsible for the ground treatment with the assistance of Soletanche of Paris, inventors of the system.

The contractor is Edmund Nuttall, Sons & Co., London, and the consulting engineers are Mott, Hay & Anderson.

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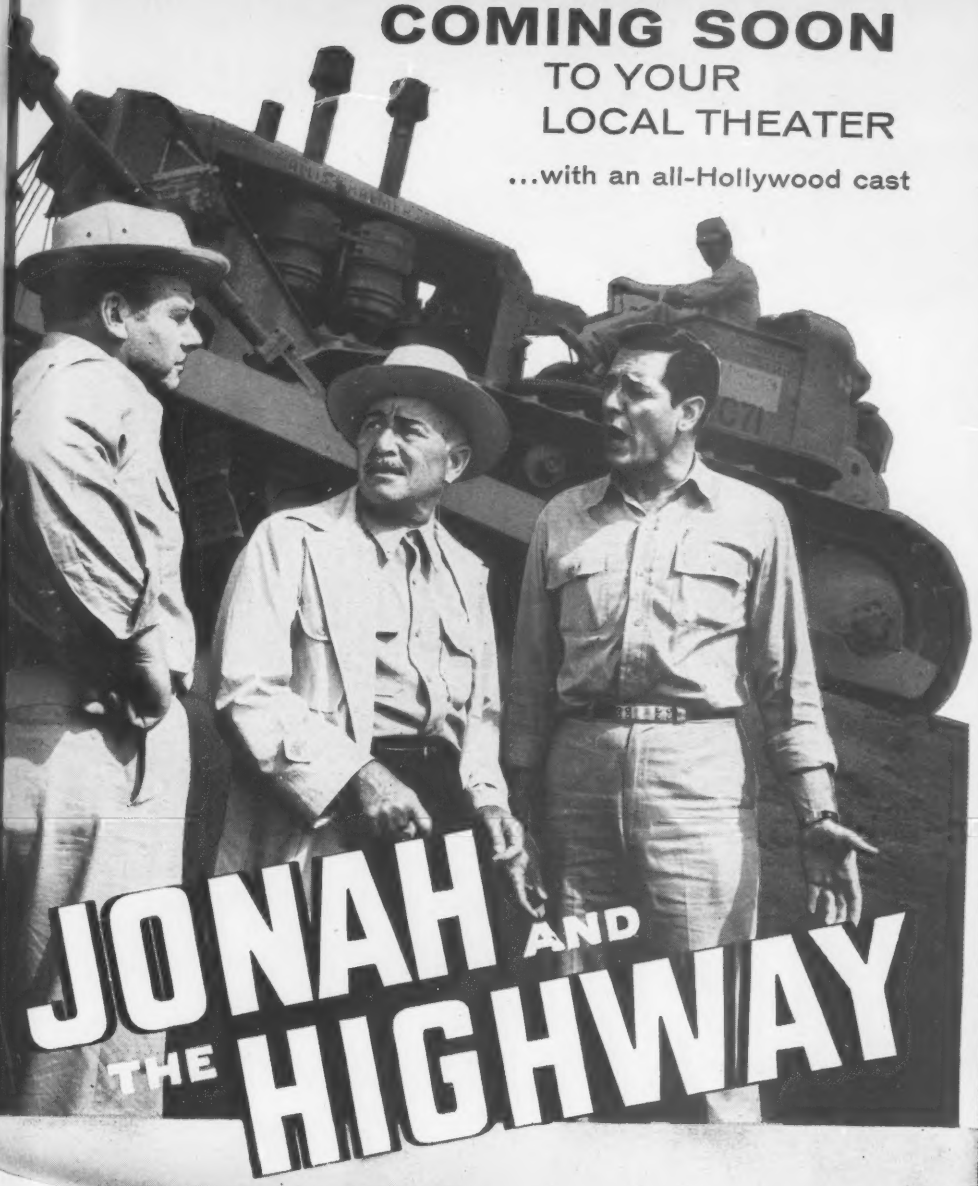


JONAH AND THE HIGHWAY

the show that's on the road

to tell everyone about
the suspense and excitement
the challenges and triumphs

THAT ARE EVERY-DAY OCCURRENCES TO THE MODERN HIGHWAY ENGINEER AND CONTRACTOR

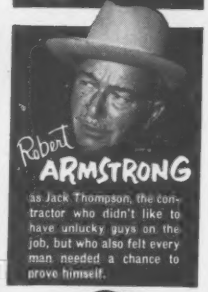
KEEP OUR ROADS ON THE GO

Craig **STEVENS**

as Bill White, who had worked on two jobs that had gone bad and now felt that he was a "Jonah" to the highway-building business.

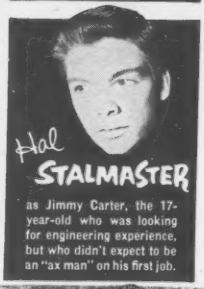
Lola **ALBRIGHT**

as Mary, Bill's wife, who thought he was the finest engineer ever graduated, but wanted Bill to think so too.



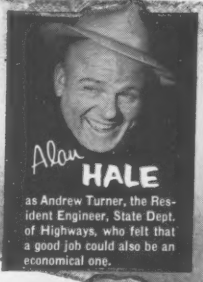
Robert **ARMSTRONG**

as Jack Thompson, the contractor who didn't like to have unlucky guys on the job, but who also felt every man needed a chance to prove himself.



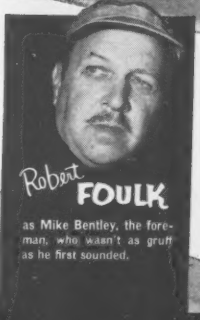
Hal **STALMASTER**

as Jimmy Carter, the 17-year-old who was looking for engineering experience, but who didn't expect to be an "ax man" on his first job.



Alan **HALE**

as Andrew Turner, the Resident Engineer, State Dept. of Highways, who felt that a good job could also be an economical one.

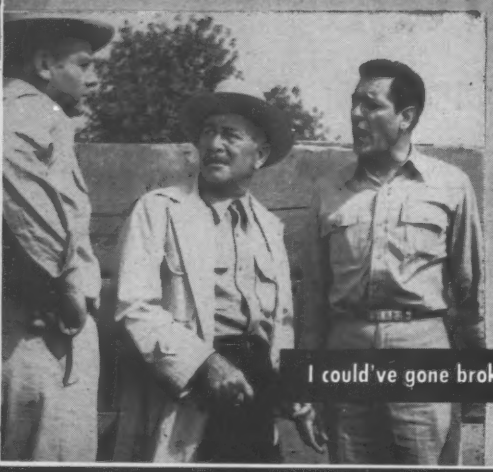


Robert **FOULK**

as Mike Bentley, the foreman, who wasn't as gruff as he first sounded.

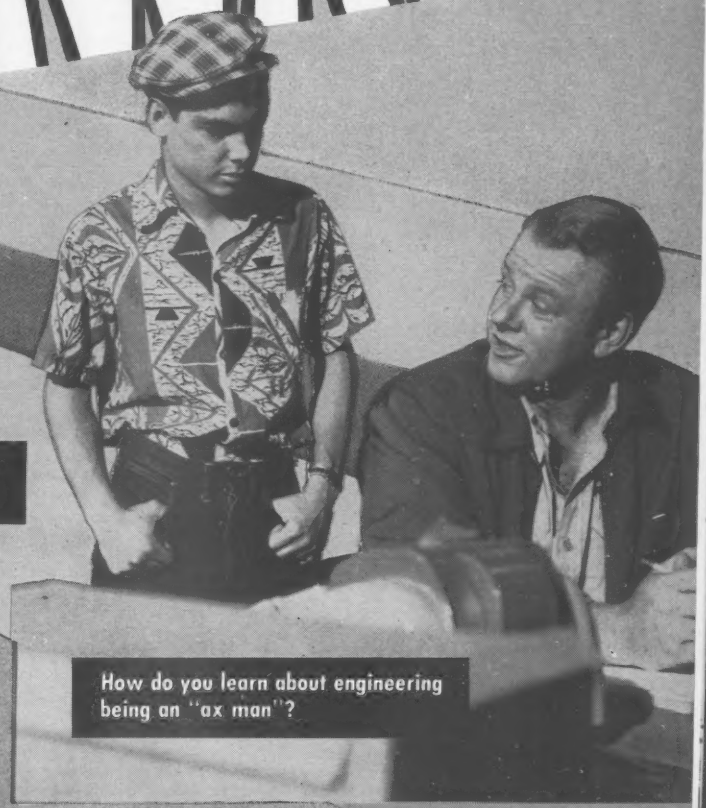
SELECTED MOMENTS OF DECISION, AND OF ULTIMATE TRIUMPH

JONAH THE



OF THREATENING DANGER
as seen in

AND HIGHWAY



USS

Produced by United States Steel in the interest of highway engineers and contractors and the Federal Highway Program.

JONAH AND THE HIGHWAY

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(This film will be available for private group showings, but not before September, 1958)

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Culvert pipe
Culvert pipe, perforated
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Bridge flooring, concrete-filled grid, *AmBridge I-Beam-Lok*
Bridge flooring, open grid, *AmBridge I-Beam-Lok*
Bridge sidewalk flooring, T-grid, *AmBridge I-Beam-Lok*
Bridge railing, *National*
Grating, expanded metal
Expansion joints
Bridge nuts, pins and tie-rods
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Bolts, high strength steel
Rivet bolts, high strength steel
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White cements, *Atlas*
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Alloy steel reinforcing bars, *Carilloy*
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Chain link fence, *Cyclone*
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Fence gates, *American*
Fence posts, *American*
Fence staples, *American*
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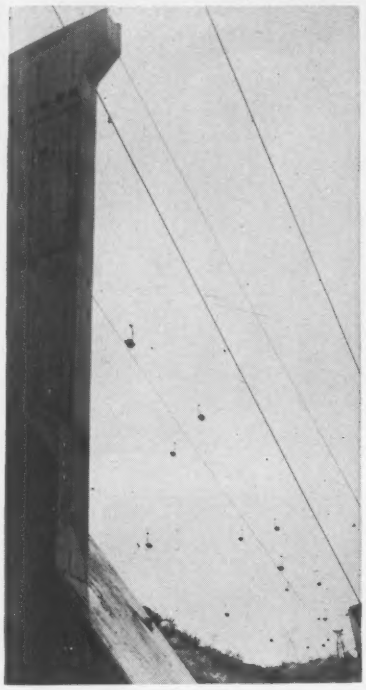
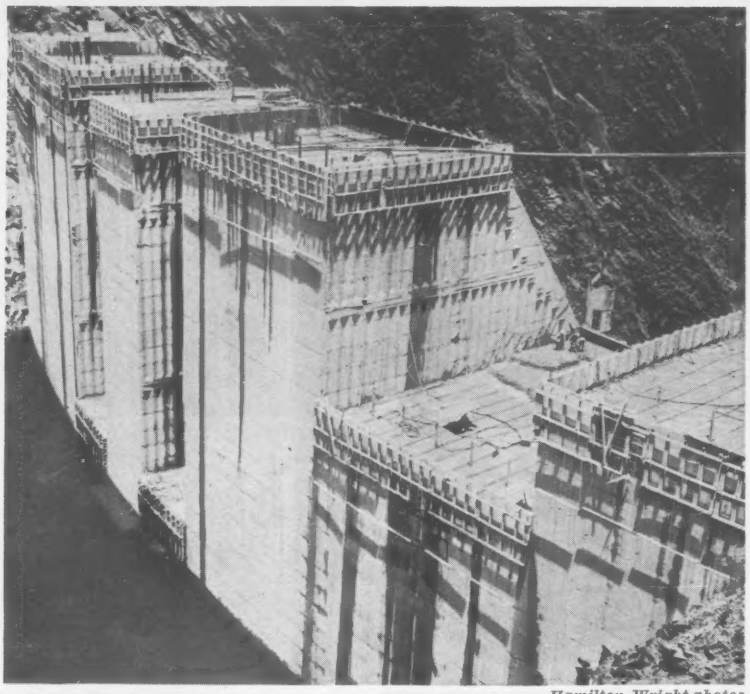


1,680 BUCKETS carry material for . . .



. . . **WU-SHEH DAM,** a 374 ft high arch-gravity structure in Formosa.

Hamilton-Wright photos

Bucket Parade Moves Dam Material

An eye-catching system of material transport is being used by the Chinese to build 374 ft high Wu-Sheh Dam, located on a tributary of the Choshui River in central Formosa (Taiwan). With no rock, cement or timber in the damsite area, all material has to come from the village of Pu-Li, some 21 highway miles away. But the large-scale trucking that would be needed for such a big job is nonexistent on the island.

Engineers solved the problem by building an aerial cableway 13 air miles across flat lands and 5,000 ft high mountain peaks. Mechanical buckets, placed every 164 ft along the cableway, each carry over 800 lb of sand and gravel, timber and other supplies on a non-stop 24-hour-a-day schedule. With a one-way trip taking 3½ hours, a second cableway was built to speed supply. So there are now 1,680 buckets traveling through the sky night and day.

• **An interrupted job**—The Wu-Sheh hydroelectric project was started in 1939 and suspended in 1944. At that time, some 23,000 cu yd of concrete had been placed, two turbine-generators installed, power tunnel and penstock completed.

Original design called for a straight overflow concrete gravity dam, 318 ft high with a volume of 458,000 cu yd of concrete. In 1953, the U. S. Bureau of Reclamation was assigned by the International Cooperation Administration to look into the project.

Design was then changed to an arch-gravity type dam, 374 ft high with a concrete volume of 444,000 cu yd. A tunnel spillway, 1,076 ft long and 27 to 39 ft in diameter, was incorporated to provide for two-thirds of design flood of 96,000 cfs. An emergency overflow spillway atop the dam will take care of the remaining one-third. Reservoir storage capacity is 118,000 acre-ft.

The previously installed turbo-generators at the dam already are generating electricity; capacity is 20,000 kw. The dam, however, won't be completed until July, 1958. Water leaving the powerhouse is reused at another hydroelectric station 25 miles away. Capacity there is also 20,000 kw.

U. S. aid on the project has run to $10 million. The government of Free China has put in $3 million since the restart of construction. Taiwan Power Co. is builder.

Mexico City Dedicates 39 Buildings in a Day

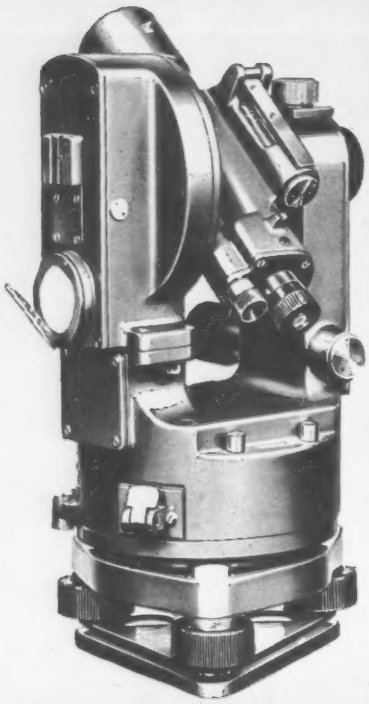
Mexico City's mayor and the president of the republic officiated recently at the dedication of 39 new buildings in one day.

It's a custom during the last two years of a presidential term south of the border to rush completion of projects undertaken at the beginning of the chief executive's six year tenure. This results in a rash of official openings. This year, which winds up the administration of President Cortines, all the ceremonies were saved for one day.

It took the president and Mayor Ernesto P. Uruchurtu all day, but they inaugurated 12 public markets, 23 schools, a penitentiary, a police headquarters, a fire station and a trolley terminal—constructed at a cost of $20 million.

(*International continued on page 66*)

F/S MODEL 4149



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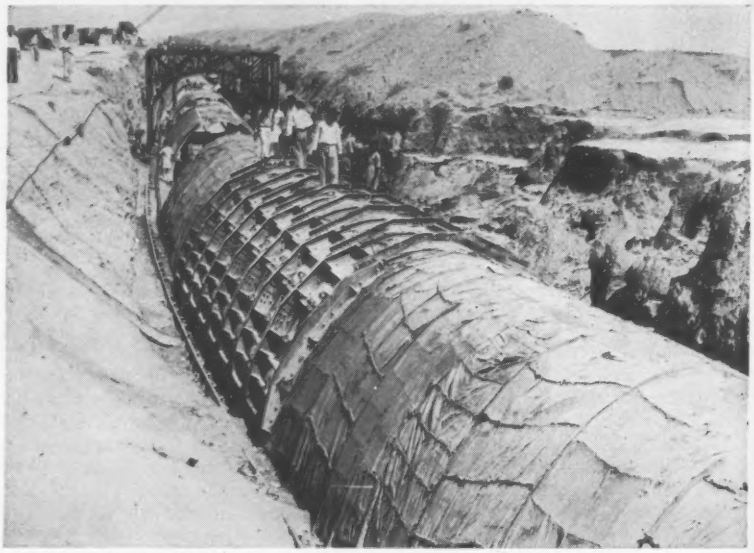
INNER FORM is slipped from length of closed concrete conduit part of aqueduct system to serve Karachi with water from the Indus River.



CROWN FORM is in place on one length as previously placed lengths are covered with burlap for curing in alternating operation.

Water for the City of Karachi

Helped by U.S. know-how and financing, Pakistan is constructing an aqueduct system to bring drinking water to the capital, Karachi, from the lower Sind Barrage on the Indus River, 120 miles away.

On the first leg of the 120 mile run, the water will flow through an irrigation canal from the Indus River to a point about 60 miles from the city. There the Karachi Water Board will take water from the canal and send it 19 miles by open canal and closed conduits to a pumping station. (A section of the 7,000-ft-long closed concrete conduit is shown in the pictures above.) Water will then be lifted 200 ft and flow by gravity to a purification plant within the Karachi city limits.

After purification, the water will be pumped again, this time 60 ft, to a distribution reservoir. From there it will flow into city mains.

The United States is furnishing technical advice for the entire project through the International Cooperation Administration. It also is furnishing economic assistance for the closed conduit and pumping plant.

(*International continued on page 68*)

Good job-planning pays off!

With 150 hp Adams 660 pushing, D Tournapulls get payloads fast. Matched speed of machines resulted in faster cycles . . . helped contractor complete job ahead of schedule.

How Michigan contractor teams 2 'Pulls with 150 hp Adams grader to save time and materials

H. H. Shinville of Kalamazoo, Michigan, has found his fleet of LeTourneau-Westinghouse earthmovers real money-makers. Contractor Shinville owns two D Tournapulls, and four heavy-duty Adams graders — two "550's", a "660" and a "512".

Leveling a section of a local road for resurfacing — near Portage Center, a suburb of Kalamazoo — contractor teamed his two 7-yd. "D's" with the "660". With this combination of units, he was able to reuse much of the existing road surface as sub-base for new grade — resulting in a substantial saving in both time and materials. Here's how Shinville's crew handled the project.

1. Blacktop scarified, pulverized —

With the scarifier, the "660" ripped asphalt road surface. In same pass, grader pulverized ripped material by pulling a 15-ton grid roller. Unit scarified and pulverized 750 cu. yds. of blacktop per hour.

2. Material stockpiled —

Tournapulls loaded pulverized asphalt from low spots, and stockpiled it for later reuse. Pushed by dozer equipped "660", "D's" averaged 6-yd. loads in 70'.

3. Bring low areas to grade —

D 'Pulls then loaded from nearby borrow pits and from high spots on road, to fill low areas to grade.

4. Reclaim asphalt as sub-base —

Finally, stockpiled asphalt was reloaded, hauled, and spread by D Tournapulls on new grade. By reusing pulverized asphalt over fill, contractor gained 3" of specified 6" sub-base. The "660" then finished off the job — preparing grade for blacktopping, sloping banks, and cutting ditches.

Remove trees — works during winter months

Shinville's Adams 660 grader also pulled over trees, and picked up rooted-out stumps with the edge of its grader blade . . . depositing them in trucks for removal. During winter months, grader plows snow for city of Galesburg, and for private parking lots and industrial sites.

Foreman Harry V. Peckens commented, "Our '660' handles a lot of jobs that you shouldn't ask a grader to do. This rugged grader takes a beating, and it hasn't hurt it at all."

Get complete facts

Why not get complete details on LeTourneau-Westinghouse earthmovers? New improved "D's" give even more yards per hour than those described here. They have 9-yd. heaped capacity, make 180° turn in area only 24'3" wide . . . within 8' width, and 9-ton axle load limit, they road without special permit.

Besides "660" shown, Contractor Shinville also owns two 123 hp Adams 550 graders and an older Model 512. Here "550" grades parking lot for Western Michigan College. Operator Erskane Banghart says, "I like the rugged dependability of the '550', and the fact that I can swing the blade under a load. That power-shift moldboard is worth a million dollars."

Adams—Trademark; Tournapull—Trademark Reg. U.S. Pat. Off. AGDP-1371-DC-1

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

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• PAGE provides a wider choice of long lasting fence fabric metals. Each has characteristics which meet individual preferences or make it more suitable to meet certain climatic or service conditions.

Galvanized Steel • Woven of time-proved open-hearth steel wire, hot-dipped galvanized after weaving to assure long service.

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Ankara Flood Was a Deadly Mud Bath

Of the 104 persons drowned in the flash flood that hit the eastern suburbs of Ankara, Turkey, early in September, many perished because the flood waters were 50% mud and therefore unswimmable.

The stream was a small tributary of the Cubuk River, which empties out of the hills into a flat flood plain. The stream's capacity between dikes was 4,000 cfs, and the flood discharge was estimated at between 21,000 and 27,000 cfs.

No major flood had occurred on the stream in many years, although one of comparable size to the recent one was experienced in 1877. The picture shows shows some of the soupy waters flowing back into the stream after the crest had passed.

Nairobi's New Town Hall Surrounds Old

By extending its town hall to four times the original size and building a new entrance, the city of Nairobi, Kenya (British East Africa), has made a new building out of the 22 year old edifice.

In fact, the structure is more a civic center for this colonial capital than just a town hall. Besides serving as municipal headquarters, it has facilities for large public and private gatherings in two wings 50 x 85 ft and 60 x 115 ft.

There is a conference hall with seating for 900 persons. A stage, orchestra pit and dressing rooms fit it for use as a concert auditorium or theater. When the function requires open floor or exhibition space, the seats can be removed and stored under the stage. The kitchen can cater a banquet for

MARACON

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WATER-REDUCING ADMIXTURES FOR CONCRETE

MARACON promotes more complete hydration of cement particles and permits a substantial reduction in the unit water content without loss of plasticity or consistency of the mix. Low water content means . . .

MINIMUM SHRINKAGE

AND BETTER CONCRETE AT LOWER COST

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A. Maintain slump and workability at low W/C ratios.

B. Attain higher strengths without increasing cement content of a mix.

C. Permit economical redesign of conventional concrete mixes.

2. IMPROVE CONCRETE QUALITY:—

A. Minimize shrinkage in concrete before and after hardening, due to lower water content and more complete hydration of cement.

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C. Achieve greater density and higher durability factors.

MARACON also reduces water requirements in concrete mixes containing pozzolanic materials.

Pouring concrete containing Maracon in construction project at Naheola, Alabama.

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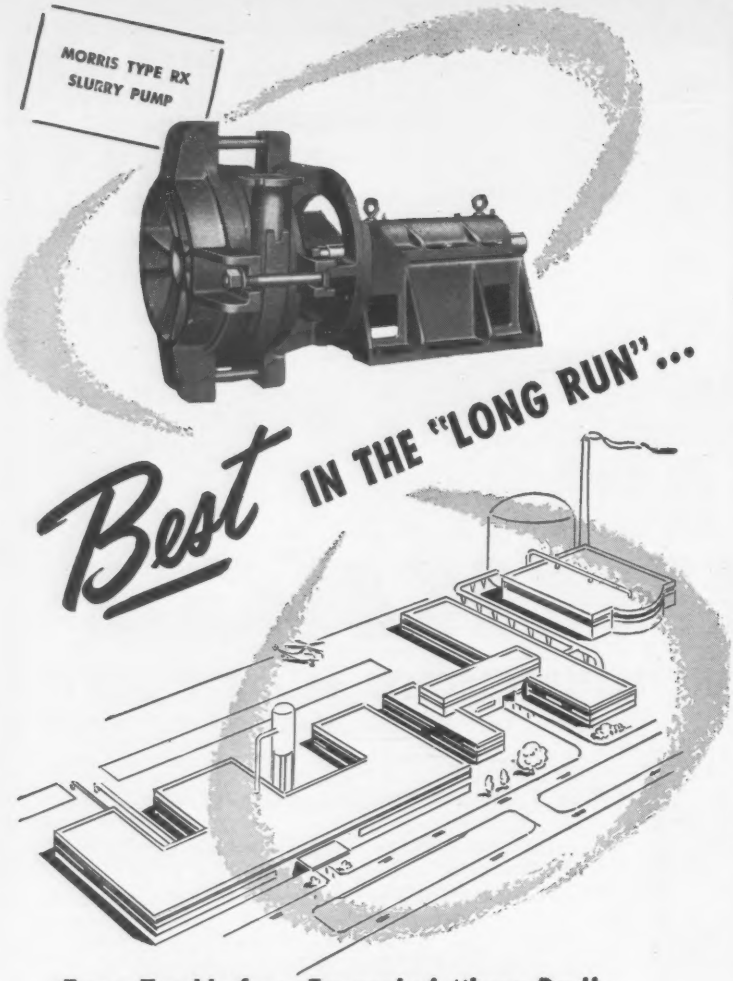

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● The Morris Pump operating right now will continue to function efficiently for many years to come. Long periods of testing have proved that.

Every pump built by Morris Machine Works is extremely rugged, dependable, trouble-free; operates with minimum attention . . . cuts maintenance costs . . . can be quickly dismantled for inspection, avoiding lengthy and expensive lay-up time.

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500 persons or simpler fare for many more.

City authorities anticipate that a pleasant climate and a commanding position in Africa's airline network (12 lines serve the city) make Nairobi a likely center for world conferences. Accordingly, they have equipped the building with translation apparatus. And already space has been booked for an international gathering next year.

Office space in the building is in a five-story section at the rear. There is underground parking for 80 cars.

Engineering Work Starts At Mont Blanc Tunnel Site

With surveyors and geologists already at work, French and Italian authorities expect to get actual construction under way at the end of winter on the long-planned tunnel under Mont Blanc, connecting the two countries directly by road.

By next spring, some 3,000 men and their equipment are expected to be at work on both ends of the tunnel, with a completion date set for the end of 1960.

The Italian end of the tunnel will be located almost at the town of Entreves, on the banks of the Dora Baltea River, about 10 miles north of the winter resort of Courmayeur. The tunnel mouth on the French side will be at Hameaudes-Palerins, near the resort of Chamonix. Elevation at the French side will be 3,946 ft; at the Italian side, 4,526 ft above sea level. The center of the 39,032 ft tunnel will be higher than either side, at an elevation of 5,232 ft. The tube is to be 27 ft, 10 in. wide and 22 ft, 8 in. high, to permit two paving lanes of traffic.

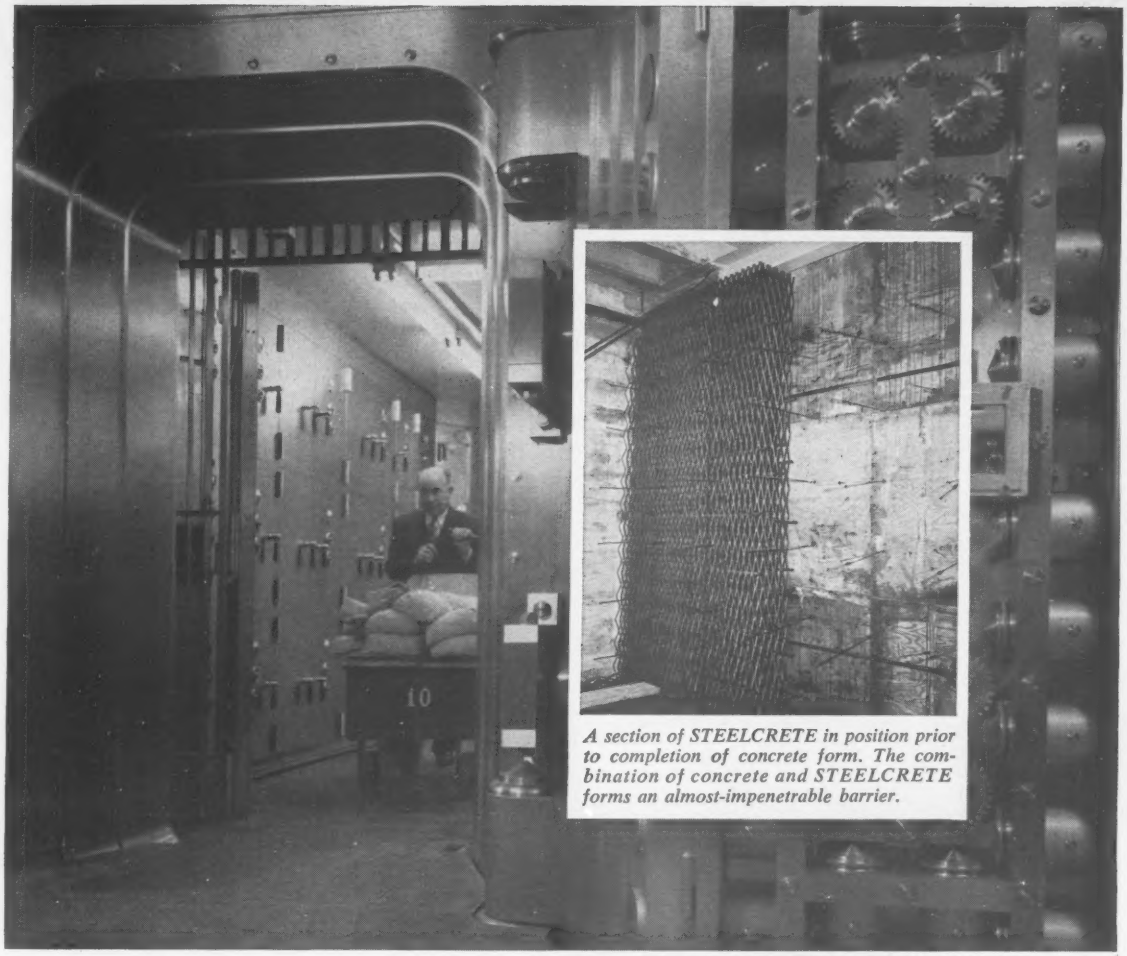
The tunnel has been designed as a key part of a new European north-south highway, linking the countries that have banded together in a European common market.

Construction to Start For Peru Iron Deposits

Construction of facilities for Peruvian ore shipment, to cost about $7 million, is expected to get under way in January.

The plan is to develop the Acari iron ore deposits, some 375 miles south of Lima in the Andean foothills. The mining claim comprises 60,000 acres of ore bearing land on which Panamerican Commodities, S. A. of Lima, has located some 12 veins of high grade magnetite ore.

The Project will include a new pier at San Juan Bay, and a 31-mile highway connecting the port and the mine.



A section of STEELCRETE in position prior to completion of concrete form. The combination of concrete and STEELCRETE forms an almost-impenetrable barrier.

Exterior size of this vault is 39' x 19'8" x 11'10". Materials used in its construction included 72,600 pounds of STEELCRETE and 143 cubic yards of concrete.

Wheeling STEELCRETE provides maximum protection for new Indiana National Bank vault

OWNER	Indiana National Bank Indianapolis, Indiana
ARCHITECT	D. A. Bohlen & Son Indianapolis, Indiana
GENERAL CONTRACTOR	Wm. P. Jungclaus Company, Inc. Indianapolis, Indiana

As with banks all over America, the Indiana National Bank of Indianapolis chose Wheeling STEELCRETE for the protective material in the new, enlarged vault at its main office.

According to August C. Bohlen, architect for the project, Wheeling STEELCRETE was used because "the interlacing of the steel makes a very secure reinforcing and it is approved for the highest rating of the several insurance companies."

In addition to bank officials and architects, STEELCRETE reinforcing is also praised by builders. The general contractor on the Indiana National Bank project, Mr. Fred W. Jungclaus, president, of Wm. P. Jungclaus Co., Inc., for example, says, "I found STEELCRETE exceptionally easy to work with and – from its construction – I know that it will give the vault the greatest possible protection!"

Given the highest rating by the National Bureau of Casualty Underwriters . . . accepted and used in various Federal Reserve, National and other banking institutions, Wheeling STEELCRETE can solve every bank vault protection problem. Write today for full details. Wheeling Corrugating Company, Wheeling, W. Va.

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ALL-NEW HAMILTON

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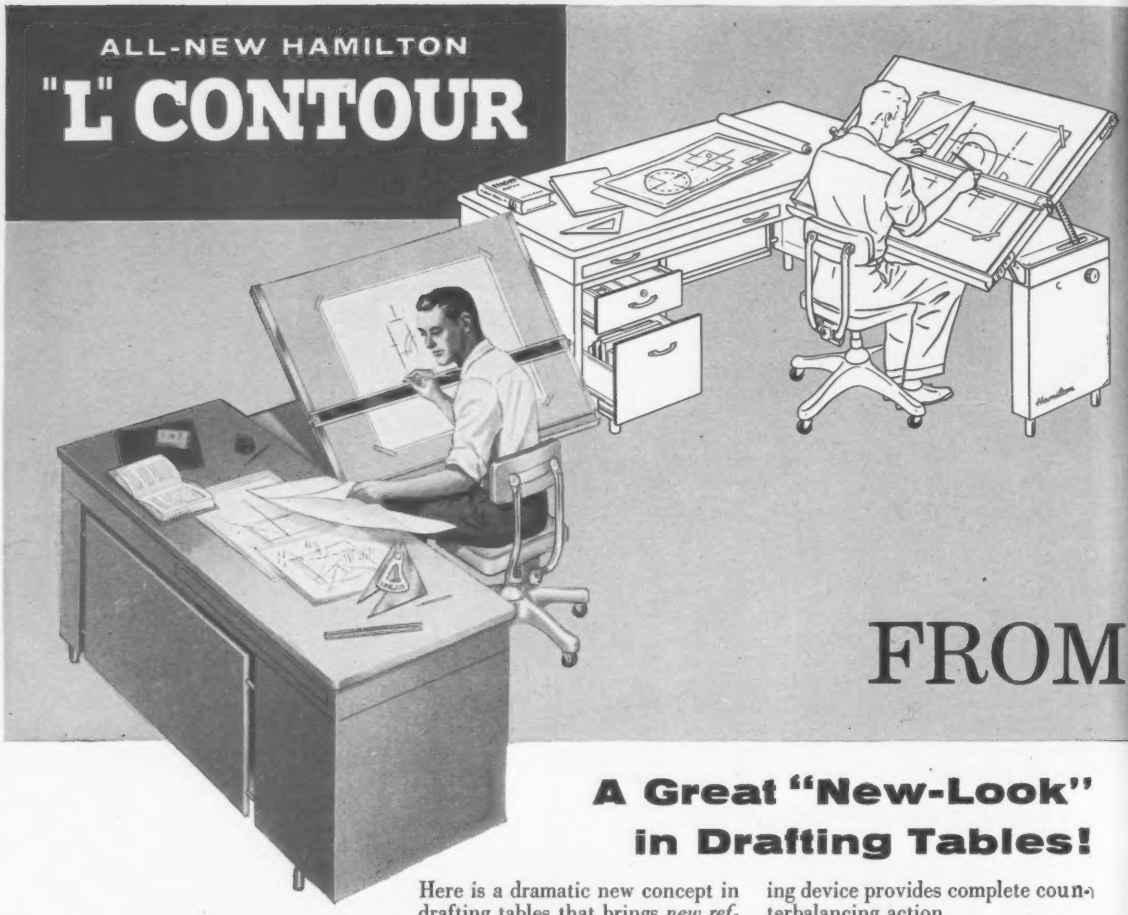


FROM B

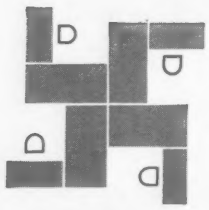
A Great "New-Look" in Drafting Tables!

Here is a dramatic new concept in drafting tables that brings *new reference convenience, new personalized working space, new smartness of surroundings* to modern engineers and draftsmen!

The unique "L" contour allows quick, comfortable movement between drawing board and reference desk. The desk-high, fully adjustable drawing board insures efficient, comfortable working positions. It can be adjusted to any angle from horizontal to vertical, has a 20" vertical adjustment. It automatically locks at 35° from vertical until released manually. An angle sensing device provides complete counterbalancing action.

The versatility of the "L" contour table lends itself to efficient room layouts. The reference desk can be changed to right hand or left hand. The entire unit takes only 60" x 71" floor space.

Now, at last, you can give your engineers and draftsmen efficient, smart-looking, "private office" working areas—achieve a higher degree of morale—with an installation of new "L" contour tables. Take this opportunity to get full information by mailing the coupon at the right.



Here is one of the many arrangements you can make with versatile "L" contour tables to meet any specific requirement you might have.

Whether it's the newest in drafting room furniture or drawing pencils, you can get it from Bruning. There's a Bruning branch office near you. Why not make it your one convenient source for everything you need in drafting and reproduction?

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NEW, IMPROVED HAMILTON

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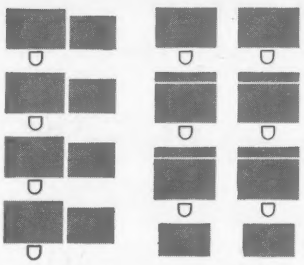

Conventional Arrangement

Auto-Shift Arrangement

A Great Drafting Table— Made Even Better!

To thousands of drafting departments, Auto-Shift has meant *maximum* production in *minimum* of floor space. Now, new design and new features further increase the utility of Auto-Shift, bring new smartness and dignity to modern engineering and drafting departments.

New Auto-Shift comes in a new green color, complementary to any modern office decor. From the new chrome plated adjustable legs to the new green drawing surface; Auto-Shift is streamlined and handsome. Vertical and tilt controls are handily located at the left side but concealed from view. Many new conveniences include: roll tracing storage bin, full depth book case and upper shelf for extra storage, reference surface that extends 7½" and locks in position, exclusive mounting strip for linoleum cover.

New Auto-Shift is timely! With today's shortage of good draftsmen, Auto-Shift will help you hold your best men, help them do their best work. You owe it to yourself and your company to investigate by mailing the coupon below.

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Ask your Bruning representative about the free Bruning-Hamilton drafting room planning service.

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HOW TO HANDLE WET JOBS

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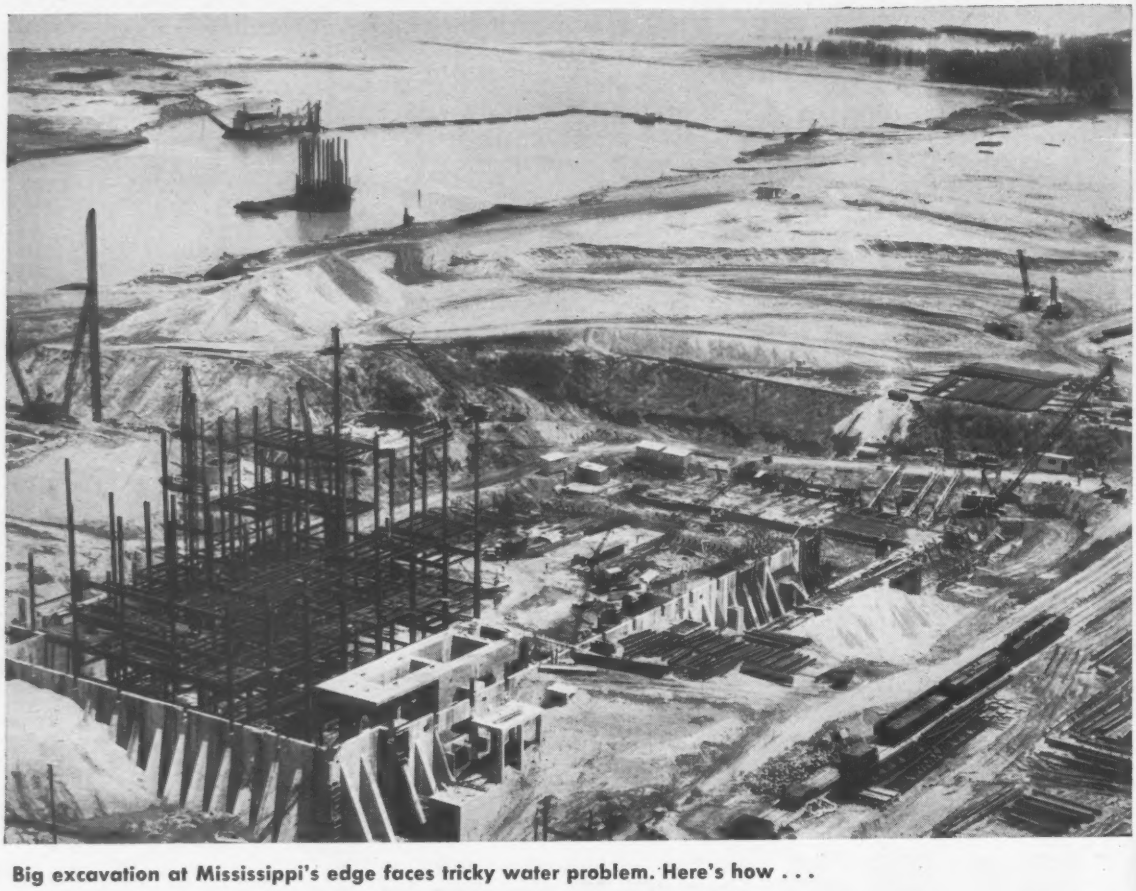

Big excavation at Mississippi's edge faces tricky water problem. Here's how . . .

Dewatering Plan Safeguards Site as River Rises

With the Mississippi River due to rise, contractor J. A. Jones was confronted with this ground-water problem. The soil was medium to coarse sand with a stratified overburden. Seepage through the overburden — pressed on by the swollen river—would imperil the excavation slopes.

• **To head off trouble,** Griffin engineers devised a "double-play" strategy. Vertical sand drains were installed to intercept the seepage—then relay the water downward where it was handled by a wellpoint system.

• **Result: An economical** (1-stage) Griffin wellpoint system kept firm control of 28 ft of water—inside a perimeter of half-mile length. With dry conditions, the job proceeded safely, on schedule. When *you* have wet work, work with Griffin.

GRIFFIN WELLPOINT CORP.

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Branches: Jacksonville, Fla. • West Palm Beach, Fla. • New York, N. Y. • Hammond, Ind. • Houston, Tex.
In Canada: Construction Equipment Co., Ltd., Toronto • Montreal • Edmonton • Vancouver
In Venezuela: Drew Bear & Sons C.A., Caracas • Maracaibo

Radio Telephone System Can Dial Headquarters

A new automatic switchboard for radiotelephones is said to allow two-way dialing between mobile units and their headquarters or other mobile units, eliminating the need for a manual operator.

At present available for private systems, equipment is expected to connect automatically into standard telephone systems so that mobile units may be used as a conventional dial telephone.

The automatic operator was made possible by two key components developed by Electrical Communications, San Francisco, together with General Electric Co., which will offer the equipment as part of its radiotelephone line. The components are selective control devices—a radio pulse decoder and a dial sender.

The equipment also can be used to dial numbers from a parked or moving car to open gates, start or stop machinery, turn lights on or off, or actuate almost any kind of electrically controlled device. General Electric Co., Schenectady, N. Y.

Submersible Pump Features Varied Controls

Capacity of the Kenco Model 110 submersible pump has been increased to 83 gpm at a 10 ft head, with a 30 ft shutoff head.

The pump is driven by a ½ hp motor and uses a ceramic seal seat mounted on the impeller back to seal the motor shaft from the fluid being pumped.

The completely submersible pump has a liquid level control switch built into its water tight top. The new Model 110 is available with any of three controls: non-automatic, fully automatic and manual-automatic. Kenco Pump Div., The American Crucible Products Co., 1305 Oberlin Ave., Lorain, Ohio.

Tournapull Has Choice Of Gear-Shift Methods

Buyers of LeTourneau-Westinghouse "B" Tournapulls now have a choice of transmissions—a torque converter or conventional manual shift type, according to a company announcement.

The new torque converter version of the prime mover can be had with any of the standard "B" size interchangeable trailing tools, including the 27 yd Fullpak scraper, 35 ton rear dump or 30 ton mobile crane.

Many related mechanical changes were made to assure precise balance of associated components. The most important of these changes is the adoption of a bigger 335 hp turbocharged diesel engine as standard equipment for torque converter machines. The transmission consists of single stage, four element torque converter combined with a heavy duty, power shift gear box. Four forward and two reverse ranges provide the equivalent of an infinite number of gear ratios with speeds up to 30 mph.

One of its features is an automatic lock-up clutch in the unit, which has been added to provide maximum operating efficiency and economy. This clutch eliminates power consuming slippage in the converter at haul speeds.

Also included is a hydraulic retarder. This unit, an additional rotorstator and valve system, automatically provides counter pressure when decending grades in any forward range. Developing a retarding force of up to 1,200 lb ft torque, under most conditions it makes use of service brakes necessary only for bringing the unit to a full stop. LeTourneau-Westinghouse Co., 2301 N. E. Adams St., Peoria, Ill.

New Entry in Small Computer Field

The International Business Machines Corp. has introduced a small general purpose electronic computer to fill out its line. Known as the 610 Auto-Point Computer, the new unit rents for $1,150 a month and sells for $55,000.

The 610 has the usual ability of electronic data processing equipment to proceed automatically through a series of computations governed by a set of instructions. However, it marks the first time IBM has departed from its famous punched card system.

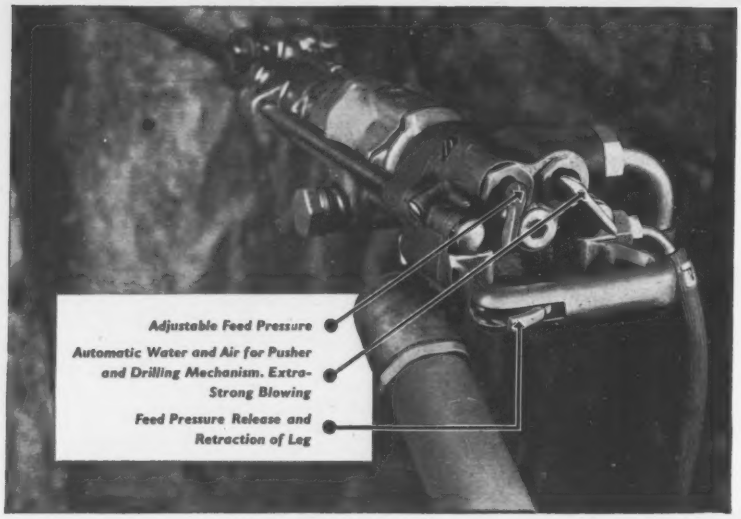
The 610 uses a punched paper tape and/or manual keyboard input system and a paper type and/or electric typewriter output system. It is equipped with magnetic drum storage containing 84 locations. However, the program and input data are handled from paper tape rather than on an internally-stored basis, so the magnetic drum is required only for working, or intra-problem, storage.

The name Auto-Point derives from the computer's ability to automatically position the decimal point.

According to IBM, its new computer is applicable to bridge and highway engineering problems, matrix algebra and integration of ordinary and simple partial differential equations, as well as a host of other problems not as directly related to civil engineering.

The 610 operates at speeds much slower than those of computers in a similar price range. IBM believes this to be a great advantage for problems of the stop and go variety, which require decisions by an engineer as the problem is processed in the computer. Programming of the computer is said to be simple, making the computer adaptable to problems of a low repetitive nature. International Business Machines Corp., 590 Madison Ave., New York 22.

(*New Products continued on page 76*)


Adjustable Feed Pressure
Automatic Water and Air for Pusher and Drilling Mechanism. Extra-Strong Blowing
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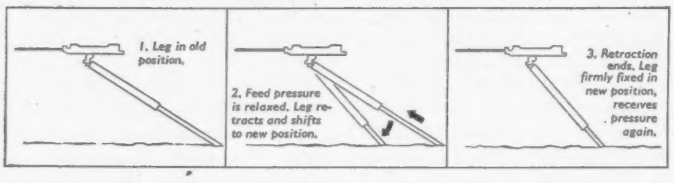
the most remarkable heavy-duty pusher-leg drill on the market

The Lion is the only rock drill with retractable leg operated from the backhead, which means quicker repositioning. It is also one of the very few drills on the market with all the operating valves controlled by one hand. Both these features make for great savings in time and manpower: in addition, the Lion has an especially high drilling speed compared with other drills in the same class.

THE RIGHT STEELS FOR THE LION

With the Lion choose Sandvik Coromant tungsten-carbide-tipped integral steels—the most widely used in the world—or Sandvik Coromant detachable bits and extension steel equipment.

PUSHER LEG ADVANCES WITH DRILL IN ACTION


1. Leg in old position.
2. Feed pressure is relaxed. Leg retracts and shifts to new position.
3. Retraction ends. Leg firmly fixed in new position, receives pressure again.

Write, phone or cable today for further details to any of the addresses below:—

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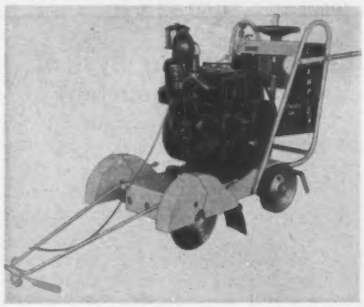


Self Propulsion Added To Small Concrete Saw

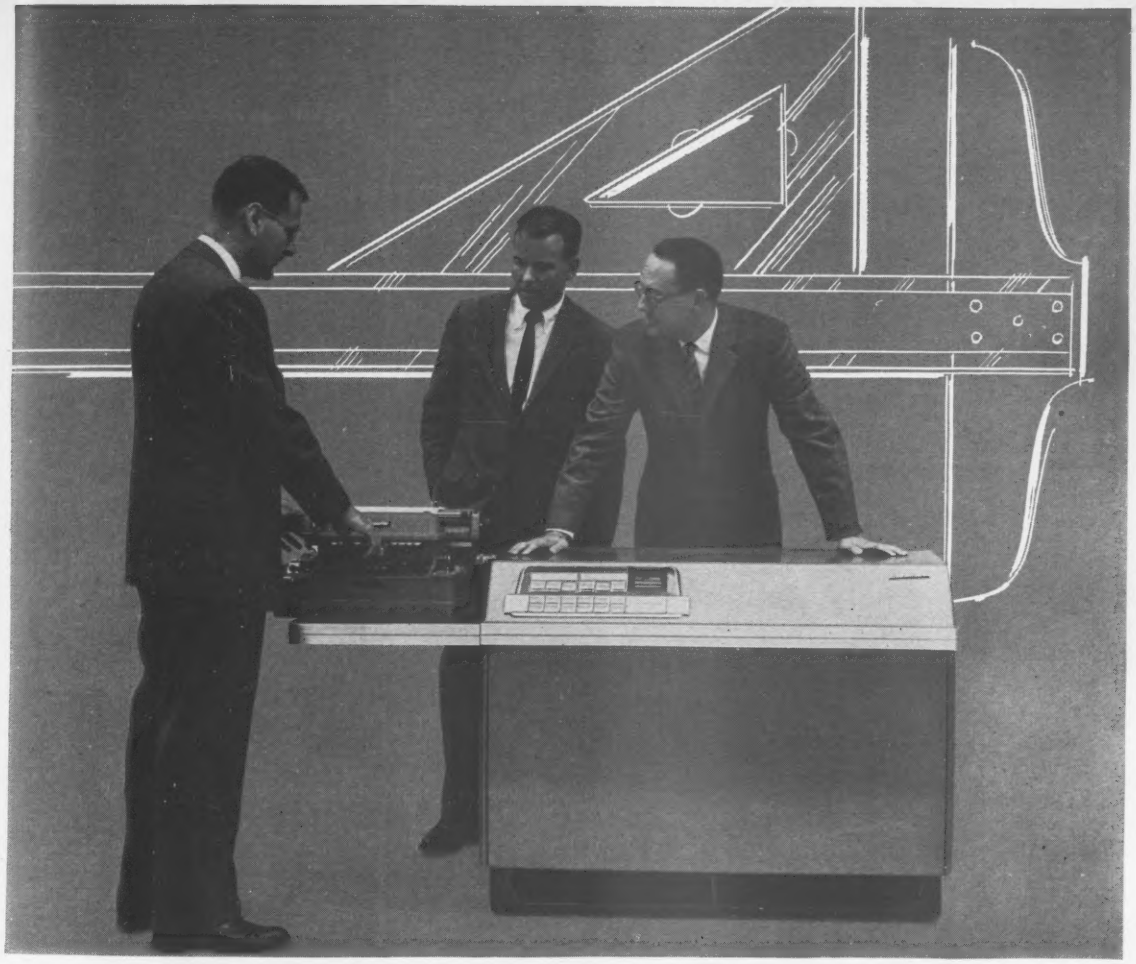
To meet growing demands of contractors for a concrete saw small enough to be easily maneuverable—yet powerful enough to do heavy duty work—Champion Manufacturing Co. now makes its smallest concrete saw available with self propulsion.

Model CS-500 makes use of a rerated Wisconsin TF Engine providing over 18 hp. It is designed for sawing contraction joints, trenching, patching and, according to the manufacturer, almost any job done by heavier saws. CHAMPION MANUFACTURING CO., 2028 WASHINGTON AVE., ST. LOUIS 3, MO.

Ball Penetration Device Measures Concrete Slump

Consistency of fresh concrete can be determined rapidly, according to the manufacturer, with a new instrument called Ball Penetration Apparatus. Concrete can be tested either as placed in forms or in a suitable container.

The device consists of a cylinder with a ball-shaped bottom and a handle weighing 30 lb. A lightweight metal frame guides the handle and serves as a reference for measuring depth of



Get greater productivity in highway design with this powerful electronic computer ROYAL PRECISION LGP-30

Large capacity... easily programmed and operated... mobile... low in cost

Here, at last, is a complete general-purpose electronic computer within the reach of every civil engineering firm. Remarkably small in size, completely mobile, LGP-30 saves time and money in the design of dams, bridges, highways . . . eliminates the tedium of routine calculation by bringing high-speed computation *right to your desk.* And at the lowest cost ever for a complete computer system!

Faster answers; unusual capacity. With speed and memory (4096 words) comparable to computers many times its size and cost, LGP-30 gives you fast, effortless answers to such problems as cut and fill, grade profile, traverse closure, field stakeout, bridge design, highway alignment. Self-cooled, LGP-30 operates from any convenient wall outlet, gives you stored-program operation for greater flexibility. (For example, highway design geometry breaks down into approximately 14 different component problems; these may all be stored in the LGP-30 and used in whatever combination is required.) Thus you save valuable time, cut costs, better your competitive position.

Easy to operate and program. LGP-30's remarkably simplified controls may be operated with only minimum computer experience. Answers are printed out directly . . . do not require deciphering. Programming is easily learned. A library of sub-routines, plus programs for a wide variety of applications, are available.

Wide range; exceptional value. The most powerful computer of its size yet developed, LGP-30 is the greatest value in today's market. Smallest initial investment ever for a complete computer . . . low operating and maintenance costs. Service available coast-to-coast.

For further information and specifications, write Royal McBee Corporation, Data Processing Equipment Division, Port Chester, N. Y.

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WORLD'S LARGEST MANUFACTURER OF TYPEWRITERS AND MAKER OF DATA PROCESSING EQUIPMENT

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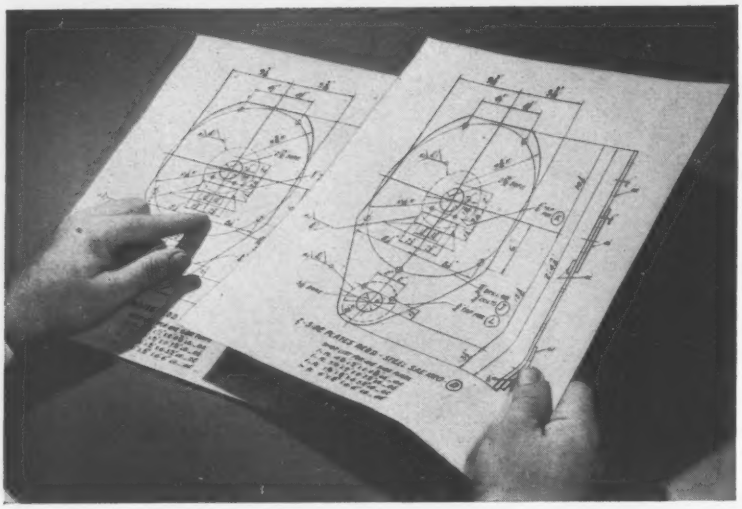


Even a printmaking expert cannot look at these two prints and tell which original drawing was made on Phantom Ruled Blutex. Still, there were hours of difference in drafting time required to make the two identical drawings from which these prints came. Write today for a free sample of Phantom Ruled Blutex and see the proof for yourself.

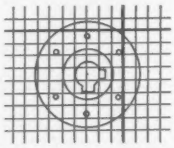
Phantom ruled vellum leaves more time for creative drafting

Working with scaling aids often takes valuable time from the basic job of creative drafting. Add the wasted hours spent drawing guide lines, lettering and handling similar routine drafting problems, and you have the reasons why POST developed Phantom Ruled Blutex.

This new vellum is basically POST's Blutex, unchanged except for the addition of phantom grid lines. The result is a combination of all the time-saving advantages of grid paper with all the drawing and reproduction advantages of famous Blutex vellum.

By using the grid lines, a draftsman works quickly to scale without constantly reaching for scaling instruments. Proportioning and resizing are easier and faster. Freehand drawing truly becomes a rapid, highly creative method of recording ideas. Even lettering and dimensioning are transformed into simpler, less time-killing jobs.

In printmaking, the grid lines disappear completely, leaving a sharp, contrasty print.



More about Blutex

The carefully controlled, uniform tooth on Blutex's surface easily "takes" dense, opaque pencil lines that resist smudging and smearing. Those sharp lines, plus Blutex's excellent transparency, assure fast printback and sharp reproductions.

Due to its carefully selected 100% rag content base, Blutex stands up well under prolonged handling. Even when alterations are done years after an original drawing is completed, Blutex still retains its fine ghost-free erasing qualities and easy erasability.

Free sample offer

For a test sample, write to the Reader Service Division of Frederick Post Company, 3658 N. Avondale Ave., Chicago 18.

POST

SENSITIZED PAPERS & CLOTHS • TRACING & DRAWING MEDIUMS • DRAWING INSTRUMENTS & SLIDE RULES
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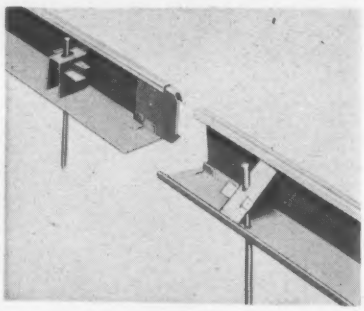
penetration of the ball. MODEL No. CT-386, SOILTES9, INC., 711 W. NORTH AVE., CHICAGO 39, ILL.



Road Form Designed For Smooth Locking

Both single and double-wedge road form types which have specially designed standard slide locks that make them fully interchangeable are now being offered. Construction of the one-piece slide lock is simple for ease of engaging operation.

Formed of heavy ¾ in. alloy steel plate, the slide locks have top and bottom rolled design that gives the strength of channel sections, according to the manufacturer. The top flange gives a full 2-in. tread for maximum strength and traction of form-traveling equipment.

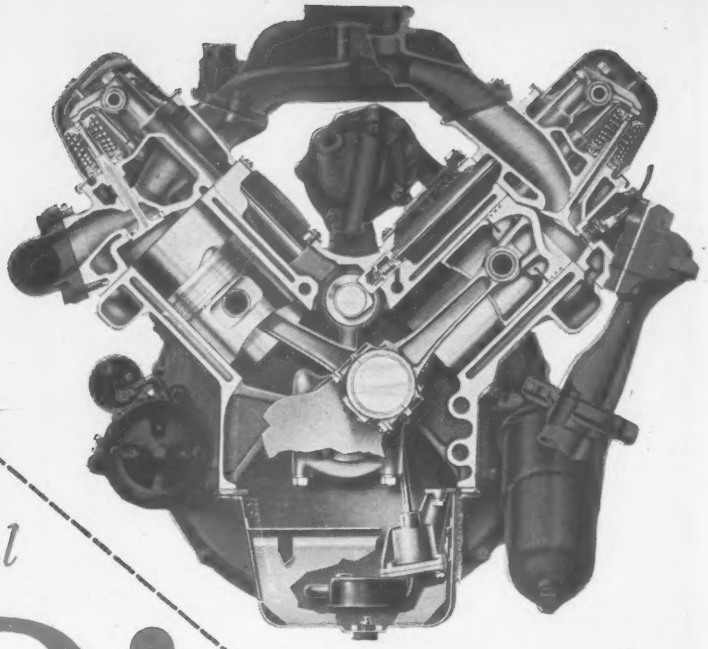
The double-wedge stake pocket forms have a box-design stake pocket. Slotted stake holes with two wedge keys give automatic alignment, a time-saving setup feature that is especially important in present day highway work. CHAIN BELT CO., 4701 W. GREENFIELD AVE., MILWAUKEE 1, WIS.

New Front-End Loader Is Announced by Euclid

A new front-end loader with a rated payload capacity of 19 cu-ft and a struck capacity of 14 cu-ft has been introduced by the Euclid Division of General Motors Corp.

Known as Model L-7, the rubber-tired loader is the first and smallest in capacity of several later models that will be built by Euclid for bulk material handling and other work.

The manufacturer claims that the L-7 has many features that provide exceptional maneuverability, easy operation and good versatility. Wheel base is 4 ft; overall length with bucket down, is 10 ft 1½ in.; turning radius is 6 ft 2½ in., and there is a 5 in. ground clearance. Loader has rear-wheel steer and is powered by a 49 hp Continental gasoline engine. EUCLID DIV., GENERAL MOTORS CORP., CLEVELAND 17, OHIO.



New International

V-8's

Built to stay on the job longer!

INTERNATIONAL heavy-duty V-8 engines stay on the job long after high stress modified engines have failed to satisfy.

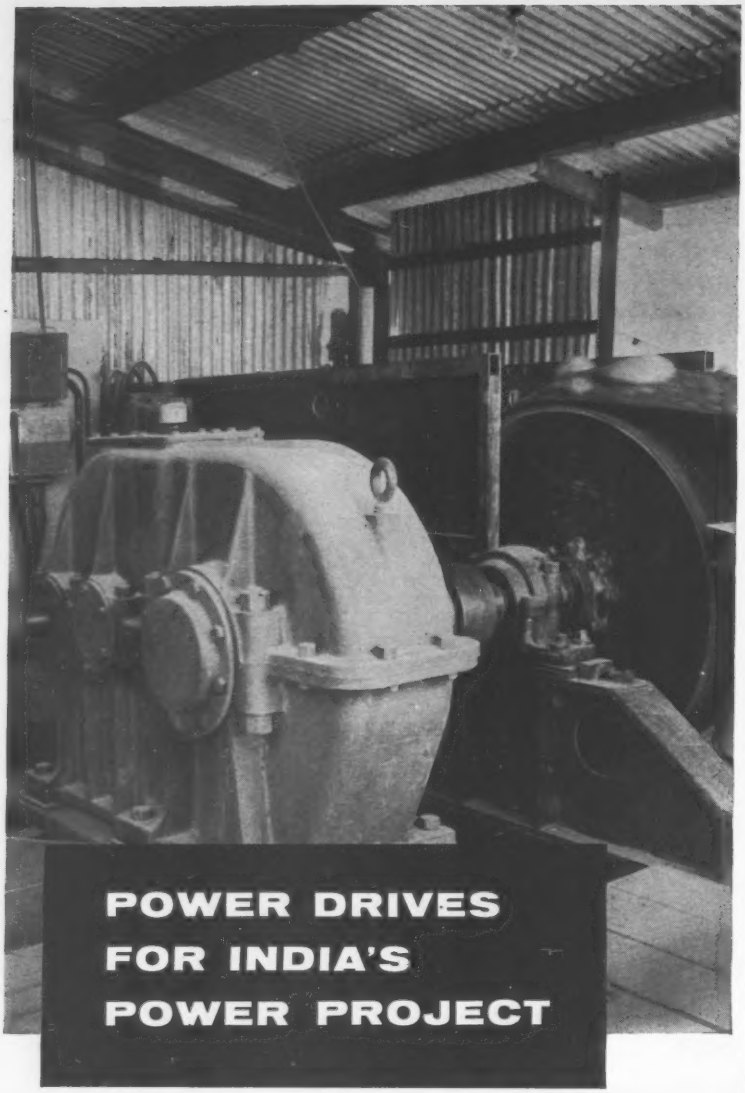
The big difference: INTERNATIONAL V-8's are *built* specifically for rugged, continuous truck operations—and they've proved it since introduction a year ago. Every part, from the heads to the pan, has built-in reserve life. For example: there are exclusive long-life "wet" replaceable exhaust valve guides, fully machined and high efficiency combustion chambers, Y-shaped, deep skirted, rigidly constructed special alloy cylinder block, and many other endurance features that also keep running costs low.

When you buy trucks to make a profit, your logical choice is an INTERNATIONAL, the heavy-duty favorite for the past 25 straight years because they are *built* to stay on the job longer.

They GO on the job! They *stay* on the job! V-8 powered INTERNATIONALS are available with 206, 226, 257 hp. engines—most powerful, most economical you can get. Models from 24,000 lbs. GVW to 76,800 lbs. GCW.

International Harvester Company, Chicago
Motor Trucks • Crawler Tractors
Construction Equipment • McCormick®
Farm Equipment and Farmall® Tractors

International Trucks cost least to own!



India is harnessing the mighty Sutlej River with the $125 million Bhakra Dam to provide power and irrigation for the Punjab area. Twenty-five Jones Herringbone Speed Reducers drive 51 Hewitt-Robins belt conveyor units used to carry aggregate over three miles of extremely rugged terrain and two miles through processing operations.

Jones Power Drives were specified because their quality construction assured continuous operation. To find out how Hewitt-Robins products and services can help you, consult your classified telephone directory for the nearest Hewitt-Robins representative, or contact Hewitt-Robins, Stamford, Conn.

HR HEWITT-ROBINS

CONVEYOR BELTING AND IDLERS . . . POWER TRANSMISSION DRIVES
INDUSTRIAL HOSE . . . VIBRATING CONVEYORS, SCREENS & SHAKEOUTS

Publications

Conveyors—A new 36 page catalog, with the theme "built to keep your materials moving," is compact and complete with a visual indexing system that makes it easy to use. It describes the two lines of job-engineered and pre-engineered conveyors manufactured. Attention is given to conveyor accessories as drive types, of which there are three. Other accessory items include head and tail sections, supports, rock ladders, troughing and support idlers, types of belt take-ups, and hoppers. PIONEER ENGINEERING, 3200 COMO AVE., MINNEAPOLIS 14, MINN.

Transits—A catalog featuring the new contractor's transit 8200 now is available. The transit, designed for builders and contractors, features a full 25 power 360 deg plunging telescope. It gives accurate readings up to one minute. DAVID WHITE INSTRUMENT CO., 2051 N. 19 ST., MILWAUKEE 5, WIS.

Cranes—Now available is a revised technical Bulletin No. 5, covering power crane applications in industrial plants. Copies may be obtained for 50 cents. POWER CRANE AND SHOVEL ASSOCIATION, 75 WEST ST., NEW YORK 6, N. Y.

Earthmoving—An illustrated booklet entitled "Earthmoving Equipment, on tracks . . . on rubber," has been published. It covers virtually the entire International-Harvester mobile construction equipment line and the occupational range extends from mining to farming. Catalog CR-542-G. CONSTRUCTION EQUIPMENT DIV., INTERNATIONAL HARVESTER CO., 180 N. MICHIGAN AVE., CHICAGO 1, ILL.

Preventive maintenance—"Shop Talk," (Form No. D745), an 8 page booklet, describes the dealer's role in supplying prompt parts and service to machine owners. Included are photographs and drawings of the specialized tools and training facilities available. The booklet also tells how owner's operators and mechanics may enroll in Dealer Cat Care Schools. CATERPILLAR TRACTOR CO., PEORIA, ILL.

Forklifts—Specifications and operating characteristics of the Clarklift Y350 and Y400, outdoor fork trucks of 35,000 lb and 40,000 lb capacities, are contained in a new catalog. Details of dimensions, travel and lift speeds, and various components are given. Charts indicate capacities at varying load centers and upright dimensions. Photographs illustrate some construction features and show several possible job

Eimco selects Torqmatic Converter for new "105" Tractor-Dozer

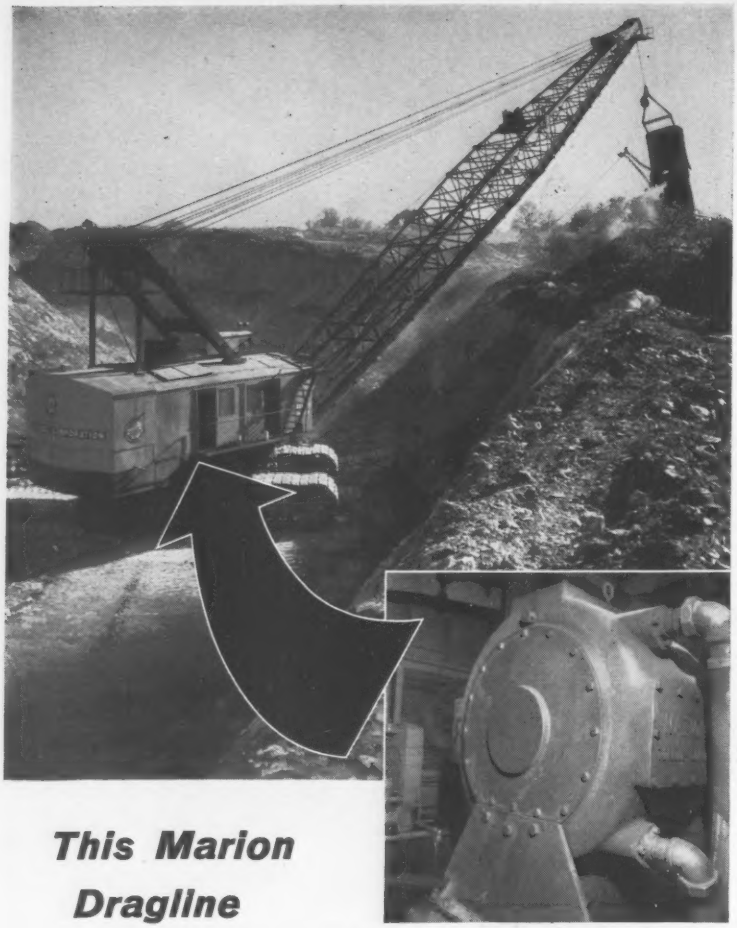
IN THE "105" Tractor-Dozer Eimco introduces a new concept in earthmoving equipment. Advanced design and engineering features—such as *up-front* operator position, *two* independent final drives and *center-mounted* power unit—provide a new high in efficiency, maneuverability and traction.

And, when it comes to power, the "105" is a beautifully engineered matched team—from fan to final drives. Its Allison TC-530 TORQMATIC Converter delivers engine power instantly and smoothly—gives the "105" nimbleness and brute strength that adds up to greater push and faster work on every job.

Eimco selected a TORQMATIC Converter because the engineering facts—backed by years of experience in the most demanding applications—prove beyond question the greater efficiency and versatility inherent to the TORQMATIC design. Bring a new high in performance and efficiency to your equipment, with such cost-saving features as integral engine mounting which eliminates troublesome universal adapters—cast converter elements for longer service life and full-range horsepower—available only with TORQMATIC. Take a tip from Eimco and more than 80 other manufacturers of 122 types of road-building and construction equipment. Get the TORQMATIC story.

ALLISON DIVISION OF GENERAL MOTORS, Indianapolis, Indiana

Allison TORQMATIC **TORQMATIC DRIVES**



This Marion Dragline and a National Torque Converter "team up" to speed up this job

Out at the Saxton Coal Corp. in Harrisburg, Illinois, this husky Marion Model 183M Dragline is busy, day after day, stripping away heavy overburden. And because it is equipped with a National Torque Converter, the job gets done faster—smoother—at lower cost.

Draglines must work at varying loads. The torque converter proportions the power supplied to the particular load, so that the machine can work up to full capacity and efficiency at all times without stalling. Furthermore, the converter absorbs shock and strain that would otherwise cause rapid wear and early maintenance.

Even though you may not own or operate draglines, shovels, or cranes, National Torque Converters may be able to save for you. If you have any heavy machinery or equipment, operating at from 100 to 1000 hp, under varying loads and on a "stop and go" cycle, it will pay you to check on the benefits in higher production and lower repairs and replacements that National Torque Converters can bring you. Just write:

THE NATIONAL SUPPLY COMPANY

INDUSTRIAL PRODUCTS DIVISION

Two Gateway Center, Pittsburgh 22, Pa.

Pace-setters in the progress of industrial power transmission

. . . Publications

applications. INDUSTRIAL TRUCK DIV., CLARK EQUIPMENT CO., BATTLE CREEK, MICH.

Diesels—International Harvester Co. has announced catalog CR-509-G covering its line of diesel power units. The booklet provides the inside story on 4-cylinder units, which range from 60 to 76 hp, and 6-cylinder units, which embrace a wider range of power—from 115 to 200 hp. One page is devoted to horsepower ratings and dimensions of the units. A power rating also is provided on the recently-introduced 250 hp Turbotorque. CONSTRUCTION EQUIPMENT DIV., INTERNATIONAL HARVESTER CO., 180 N. MICHIGAN AVE., CHICAGO 1, ILL.

Cost cutting—A recent survey made by engineers shows how contractors, builders and related operators in a variety of construction activities are getting more profits from their facilities by cutting unnecesasry labor and maintenance costs, and by reducing downtime. More than 50 illustrated case histories outline specific results obtained, and should prove of assistance to others with similar problems. Ask for Industrial Survey DH-538. DEPT. 117-C, THE GATES RUBBER CO., SALES DIV., INC., 999 SO. BROADWAY, DENVER 17, COLO.

Tractor-shovel—Production is the theme of a brochure on the 1¼ cu yd model 104 Trojan tractor-shovel. The brochure illustrates features of the machine and gives complete specifications and a list of standard and optional equipment. YALE & TOWNE MFG. CO., CONTRACTORS MACHINERY DIV., BATAVIA, N. Y.

Asphalt plants—A new bulletin describes the Hethering and Berner Mobile 60 and Mobile 40 completely wheel-mounted batch-type asphalt plants. All units of these plants are said to be self-contained, assembled to the greatest possible degree and wheel mounted. HETHERINGTON & BERNER, INC., 701-145 KENTUCKY AVE., INDIANAPOLIS 7, IND.

Tractors—A new D7, D8 and D9 tractor maintenance guide has been prepared by Caterpillar Tractor Co. as an aid to operators. Written in narrative form, it tells the story of how one tractor owner learned to keep his machine on the job with lower maintenance costs. The importance of additive oils, use of the service meter, use of filter elements, and proper methods for lubricating track rollers and idlers is discussed. FORM NO. 32395, ADVERTISING DIVISION OF CATERPILLAR TRACTOR CO., PEORIA, ILL.

San Quentin approach to the Richmond-San Rafael Bridge. Owner: State of California, Department of Public Works, Division of San Francisco Bay Toll Crossings, Berkeley, California. Contractors were Judson Pacific Murphy-Kiewit, Emeryville, California. Prestressing material was 3/8" dia. American Super-Tens Stress-Relieved Strand.

PRETENSIONED PRESTRESSED CONCRETE

where it has been...where it is going

IN DECEMBER 1951 pretensioned prestressed concrete was first used in bridge members near Hershey, Pennsylvania. From that advent this type of construction has grown to the giant it is today. Bridges, piers, retaining walls, floors, roofs, piles and light poles are among its many uses. Some of the applications which have speeded construction and which will reduce maintenance are shown on the following pages.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL • GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • PACIFIC COAST DISTRIBUTORS
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS AMERICAN SUPER-TENS STRESS-RELIEVED WIRE

and

AMERICAN SUPER-TENS STRESS-RELIEVED STRAND

UNITED STATES STEEL

Some interesting jobs made better with PRESTRESSED CONCRETE an AM

HOUSE OF WORSHIP: Architects: Faragher & Macomber, Rochester, N. Y. chose prestressed concrete for the floor and roof of this new Greek Orthodox Church in Rochester, New York. Prestressed concrete not only speeded work on this project, but it assured good resistance to fire and heat and will reduce maintenance expenses in the future. The beams were reinforced with American Super-Tens Stress-Relieved Strand, which is manufactured specifically for prestressed concrete applications. Structural Engineer: W. A. Clark, Rochester, N. Y. Contractor: Werner-Spitz Construction Company, Inc., Rochester, N. Y. Goodstone Manufacturing Company, Inc., Rochester, N. Y. manufactured the beams.

FIREPROOF ROOF: This new silk mill in Depew, New York has a prestressed roof deck made with beams manufactured by Frontier Dolomite Concrete Products, Rockport, N. Y. Prestressed concrete simplified installation, made the roof fire resistant and will cut maintenance costs. The beams were prestressed with American Super-Tens Stress-Relieved Strand. Architect was John R. Weber, New York. Freyssinet Company, New York designed the girders and columns. Leap Inc., Lakeland, Florida designed the double-tee slabs.

UNITED STATES STEEL

AMERICAN REINFORCEMENT

BLEACHER SEATS: This new athletic stadium at North Charleston, South Carolina was built with prestressed concrete to cut its installation cost and to materially reduce maintenance. Floors of the stadium are made of double-tee slabs prestressed with American Super-Tens Stress-Relieved Strand. Architects on the stadium were Halsey & Cummings, Charleston, South Carolina. Contractor was M. L. Stephenson, Charleston, South Carolina. Prestressed sections were manufactured by Carolina Concrete Pipe Co., Inc., Columbia, South Carolina.

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USS AMERICAN SUPER-TENS STRESS-RELIEVED WIRE

—— and ——

AMERICAN SUPER-TENS STRESS-RELIEVED STRAND

MORE ABOUT AMERICAN PRODUCTS FOR PRESTRESSED CONCRETE — NEXT PAGE

American Steel & Wire has

A PRODUCT THAT'S RIGHT

for every type of prestressing

American Steel & Wire has been supplying high tensile strand and wire since prestressed concrete's inception in this country. American Super-Tens Stress-Relieved Strand and Wire have been quality perfected through extensive research and through years of service in actual installations.

A wide range of sizes of American high tensile strand and wire are available to give the right prestressing force for every type of prestressing.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

SEND THE COUPON
for further information

American Steel & Wire
Room 842, Rockefeller Bldg.
Cleveland 13, Ohio

Please send your comprehensive new booklet which describes detail all of your steel products for prestressed concrete.

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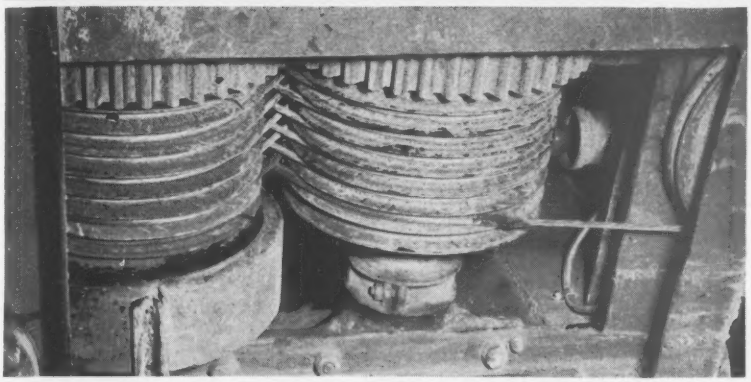
CITY ..... STATE .....

USS AMERICAN SUPER-TENS STRESS-RELIEVED WIRE

and

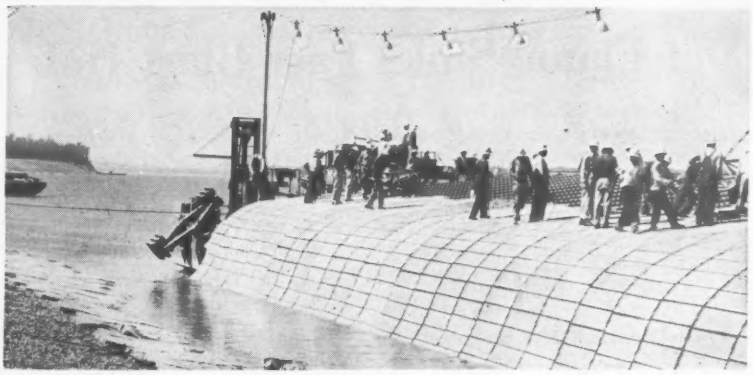
AMERICAN SUPER-TENS STRESS-RELIEVED STRAND

UNITED STATES STEEL



PROBLEM: Develop a high-strength splice flexible enough to pass through snubbing block.

SOLUTION: High strength wires preformed into a spiral that can splice cable quickly.



APPLICATION: To speed placing of articulated mattresses on banks of Mississippi River.

Special Cable Splice Speeds Reel Changes

A time-consuming and hazardous reel changing cable procedure has been discarded by the Corps of Engineers in favor of a flexible cable splice that has been able to withstand the required 20,000 lb pull on $\frac{3}{8}$ in. cable. The splice can pass through snubbing blocks, roller guides and other similar devices.

For many years the Corps had been placing articulated concrete mattresses along the banks of the Mississippi River where erosion threatens. These mats are paid out from a special sinking barge by 36 high strength $\frac{3}{8}$ in. steel wire cables which are anchored on shore and run through snubbing blocks in figure 8 configuration in the sinking barge. Whenever one of the cable

Waterstop
in place in seconds!

LABYRINTH WATERSTOP after first pour has been made and form removed. The grooves receive the concrete from the second pour, providing an interlocking joint.

Just a few seconds were needed to nail this LABYRINTH WATERSTOP to the form... just a few seconds and water seepage worries were over before they could ever have a chance to start.

LABYRINTH WATERSTOP forms a waterproof bond between two pours. The corrugated ribs bond firmly with the concrete.

LABYRINTH WATERSTOPS are made of flexible polyvinyl plastic... that has superior weathering qualities, is not affected by temperature changes and chemical activity.

LABYRINTH WATERSTOPS are easy to work with, can be cut to any desired length. "L" and "T" joints can be welded with just a hot knife. Find out now how your costs can be cut... and end your seepage problems. Just mail the coupon to:

WATER SEALS, *inc.*
9 SOUTH CLINTON STREET
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Made in Canada for
J. E. Goodman Sales Ltd.
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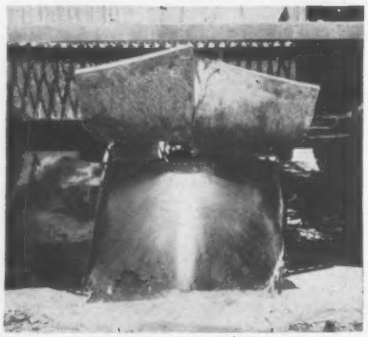
reels was exhausted, the tensioned cable had to be cut (with consequent hazard due to whipping of ends) and cable from a new reel had to be rethreaded through the snubbing blocks and spliced to the free end. The Corps previously had no splice of satisfactory strength that would pass through the snubbing blocks.

Last year the Memphis District tried a cable connector consisting of three groups of four high strength wires, preformed into a spiral having a diameter slightly smaller than the cable to be spliced. These wires are applied in a few minutes.

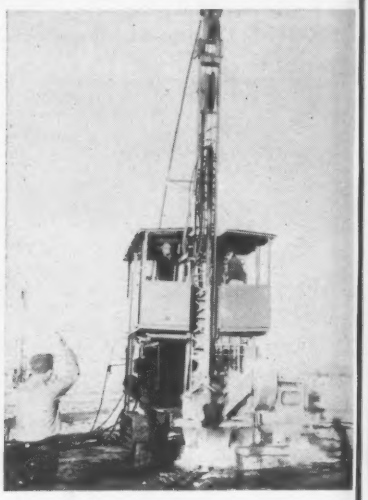
The new cable connector was used by both Memphis and Vicksburg Districts for an entire working season without a single failure, either from parting under tension or from raveling while passing through snubbing blocks or sheaves.

The splices were developed for the Corps by the Preformed Line Products Co., Cleveland.



Rock piercing flame is positioned by . . .

. . . modified churn drill rig



Jet Flame Sinks Fast Blast Holes

A jet flame produced by a rocket-type burner—much similar to those used in aircraft—is sinking blast holes in rock formations on the St. Lawrence Seaway project.

Speeds up to ten times faster than conventional drilling are cited as being possible by the developers of the process, Linde Co., a division of Union Carbide Corp.

The operation is a continuous one, wherein an 18 in. long, 2 in. wide flame shoots out of the burner at 4,000 F to disintegrate or spall the rock in its path. Rock particles are thrown up out of the hole by the force of burning gases and steam, keeping a clean new face exposed to the jet.

Penetration depth is limited only by the length of the hoses carrying fuel, oxygen and water that are lowered into the hole. Deepest hole to date is 160 ft.

Fuel is a low viscosity fuel oil or a liquid hydrocarbon fuel such as kerosene. Combined with high-purity oxygen an intensely hot jet-piercing flame is produced. A blowpipe controls flame combustion and action.

Another feature of the new process is that a blast hole can be enlarged at any desired depth to take extra explosive charges. This is done by lifting the blowpipe off the bottom of the hole and letting the jet blast away. Thus more spalling is induced in one area to produce a bottle-shaped cavity.

The jet-flame process is found to work fastest on the spallable rock class, especially those containing silica. Potsdam sandstone, the rock being pierced on the Seaway, is noted as having required as long as a week for a 100 ft hole to be drilled using churn drills. With jet piercing, a 100 ft hole has been sunk in a single shift.

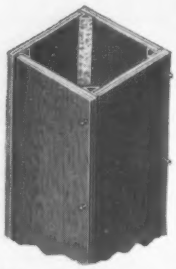
The jet-piercing equipment is carried on a modified churn drill rig. It is being used by United Waterways Constructors, Ltd., a group of Canadian contractors, on the $14 million contract involving removal of 3 million tons of rock on the Upper Beauharnois Lock job.

SUPERIOR
Speed-Strip
PAT. APPLIED FOR

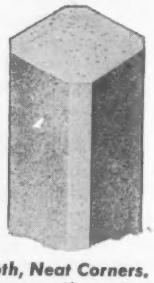
A METAL CHAMFER STRIP THAT PRODUCES NEATER, CLEANER CORNERS AT LESS COST

For better chamfers in concrete construction at less cost, investigate the important advantages of Superior Speed-Strip. Pays for itself in a few re-uses! Built for rough usage. Easy to handle and quickly nailed to edge of form lumber, plywood, or S4S. Reduces damage to forms because of minimum nailing and stripping. As Speed-Strip stays on the form during stripping, the form with chamfer is always ready for re-use. Where jobs are not typical sizes, Speed-Strip is easily detached from form boards for use on other jobs. Reduces time loss in finishing—produces smooth neat corners. Comes in 8 ft. stock lengths which may be cut or butted to any length. 24 ga. galvanized steel with 1⅛" face.

RE-USABLE
REDUCES LABOR TIME
CUTS & BUTTS TO ANY LENGTH
EASY TO HANDLE
STURDY GALVANIZED STEEL



Minimum Nailing and Minimum Wrecking



Smooth, Neat Corners. Always a uniform size and shape chamfer

SUPERIOR
CONCRETE ACCESSORIES, INC.
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Pacific Coast Plant
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AIRESEARCH TURBOCHARGERS
add power to new
ALLIS-CHALMERS CRAWLER TRACTORS

AiResearch C-60D Turbocharger

Giant new HD-21 demonstrates how a turbocharged tractor can make the big jobs easy

Allis-Chalmers, one of the leading producers of construction machinery, has selected AiResearch turbochargers as standard equipment on their new HD-21 crawler tractors. The engines of these powerful earthmovers develop 225 hp at the flywheel and 70,000 lb pull at the drawbar.

Benefits of AiResearch turbocharging include increased power output; better specific fuel consumption; sea level performance at altitude; lower engine thermal loading; and greatly decreased smoking and noise.

Reliability, high performance and long life have been proved by thousands of AiResearch turbochargers already operating in the field in all types of applications. Being air cooled, they require no complicated plumbing. They need no maintenance between normal engine overhaul periods.

• ***Your inquiries are invited.***

BASIC SPECIFICATIONS FOR AIRESEARCH TURBOCHARGERS

MODEL	F-51	C-60	A-60	E-100	B-100
Output—lb/min. (Standard Conditions)	29-51	30-60	38-60	50-100	60-100
Diameter—in. nom.	10.0	11.5	15.25	15.1	15.4
Length—in.	10.5	12.9	16.75	14.7	17.1
Weight—lb.	40.0	95.0	125.0	112.0	135.0

THE GARRETT CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

New Optical Plummet Built into Gurley Transit Saves Set-up Time, Improves Accuracy on Windy Days

Years ago, Gurley introduced lightweight instruments to combat wind vibrations. Now Gurley further beats the wind problem with an optical plummet *built into* the instrument.

The new Gurley Optical Plummet Transit eliminates swing and sway of the cord and plumb—always time-consuming and exasperating on a windy location, and inaccurate as well. Positive accuracy of set-up is assured with the Gurley Optical Plummet.

The new Gurley transit is furnished with a tripod with built-in shifting head, and allows a two-inch shift of the instrument over the point. This provides greater latitude in initial set-up.

Gurley's new Optical Plummet Transit offers one of the advantages of the optical-reading theodolite *plus* the desirable features of simplicity and universal acceptance of the American transit. For further details, write for Bulletin OP-57.

GURLEY

W. & L. E. GURLEY Union Plaza, Troy, New York

Gurley—Since 1845

Men and Jobs

TVA's W. W. Woodruff Retires After 24 Years

W. Warren Woodruff, director of Tennessee Valley Authority's division of power engineering and construction with headquarters in Chattanooga, has retired after nearly 24 years with TVA. He is succeeded by K. E. Hapgood, also with TVA for 24 years.

Mr. Woodruff joined TVA in December, 1933, the year the agency started, and throughout the years he has been in charge of the design and construction of TVA's transmission lines and substations.

A mechanical engineering graduate of Cornell University, Mr. Woodruff is an expert in the field of high-voltage power transmission. He, assisted by members of his TVA staff, prepared the current power transmission section of the McGraw-Hill Standard Handbook for Electrical Engineers.

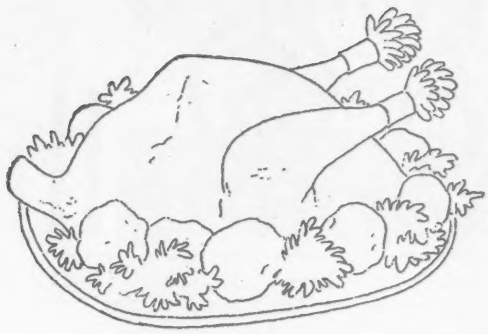
J. K. Richardson Retires; USBR Mechanical Chief

James K. Richardson, chief of the mechanical branch of the U. S. Bureau of Reclamation's engineering offices at Denver, will retire Nov. 30 after more than 25 years of government service.

As chief, Mr. Richardson has supervised the design of mechanical equipment—including power penstocks and piping systems, large gates and valves—installed in the dams and power and irrigation works built by the bureau on its projects throughout 17 Western states and Alaska.

Peter Strobel Forms New Consulting Partnership

Peter A. Strobel, formerly senior partner in the New York City consulting



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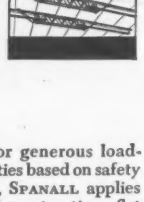

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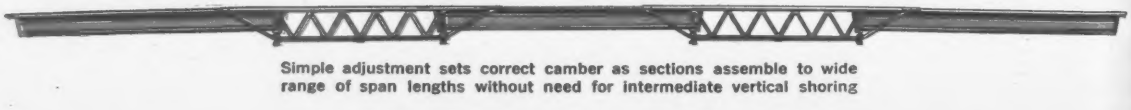


Simple adjustment sets correct camber as sections assemble to wide range of span lengths without need for intermediate vertical shoring

engineer firm of Strobel & Salzman, and one-time public buildings commissioner of the General Services Administration, has entered into a consulting engineer partnership in New York City with Paul I. Rongved. The firm will be called Strobel & Rongved.

Mr. Strobel's former partner, Joseph Salzman, died last year (ENR Nov. 15, 1956, p. 59), ending a partnership formed in 1945. Mr. Rongved has had wide design experience on bridges and buildings and is noted for his work on skewed concrete slabs.

Careers

Education

Ralph G. Champagne, formerly city engineer of Troy, N. Y., has been named head of the Construction Department of Hudson Valley Technical Institute in Troy.

Charles E. Hatch, Toledo consulting engineer, has been appointed to the Ohio Professional Engineers and Surveyors Registration Board.

Peter H. Nash has been appointed associate professor of city and regional planning at the University of North Carolina.

Business

L. S. Baldin, S. R. Fleming and **W. O. Johnson** have been elected vice presidents of Ford, Bacon & Davis, engineers-constructors of New York, Chicago, Los Angeles, Toronto and Vancouver. Mr. Fleming was also elected a vice president of Ford, Bacon & Davis Canada, Ltd., a wholly-owned subsidiary.

Frank W. Jenks, formerly executive vice president of International Harvester Co., has been elected president of that company. Mr. Jenks succeeds Peter V. Moulder who retired.

Charles DuBose has been named president of F. H. McGraw Co. of Canada, Ltd., Montreal.

S. Robert Greenstein has been named associate of Kelly & Gruzen, architects and engineers, New York City.

James R. Livingstone of Smith, Hinchman & Grylls Associates, Inc., Detroit architectural-engineering firm, has been sent to South Korea to head three design programs there.

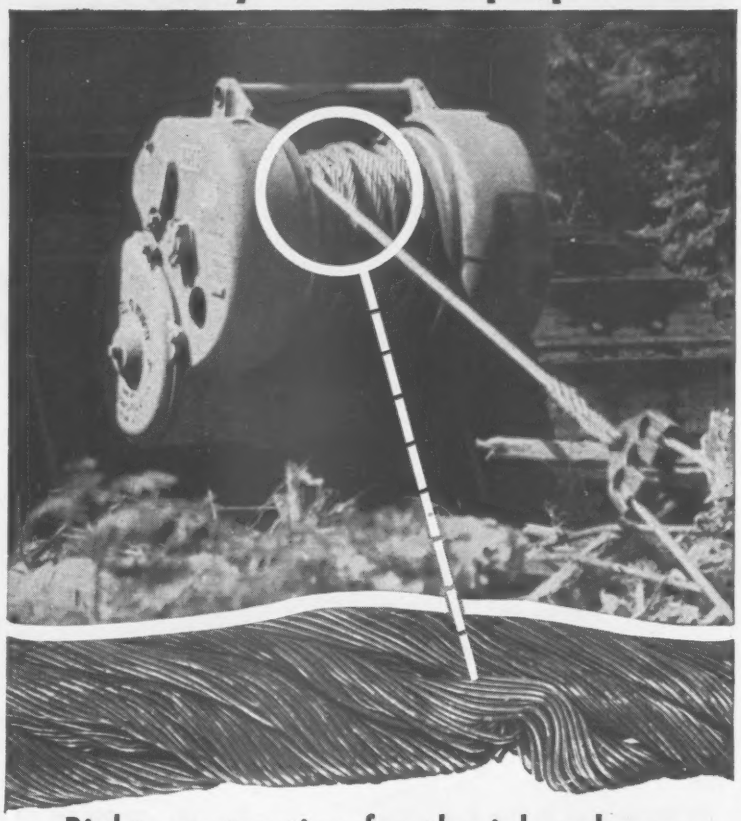
Charles T. Tench has been appointed a vice president of Palmer & Baker Engineers, Inc., New Orleans.

David Hume has been elected a director of Baltimore Contractors, Inc., Baltimore.

Albert DiGiacinto and **Donald B. McKinley** have been appointed vice presidents of Spencer, White & Prentis, Inc., New York City.

crushing...

is this your wire rope problem?



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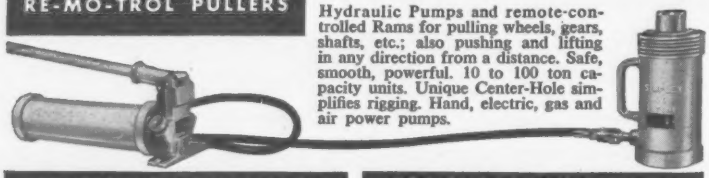

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Obituaries

Thomas D. Nolan, 59, general contractor of Louisville and Miami, Fla., died Sept. 22, in Miami.

Joseph Kemper, 88, former city engineer of Utica, N. Y., died Sept. 20. He also had served Utica as commissioner of public works.

Harold W. Smith, 63, secretary of Dinwiddie Construction Co., San Francisco, died Sept. 25 at Palo Alto, Calif. He was a member of the advisory board of the Central California Chapter, Associated General Contractors of America, Inc., and a past president of the chapter. He also was past president of the Building Industries Conference Board.

Logan Campbell, 65, engineer, died Oct. 6 in Philadelphia. He was formerly director of purchases for Catalytic Construction Co. He was a 1913 civil engineering graduate of Pennsylvania Military College.

Elmer R. Dalloz, 60, architect, died Oct. 9 in Jacksonville. He was a practicing architect in Tampa, Fla., for 17 years before moving to Jacksonville.

Linn H. Enslow, 66, editor of Water and Sewage Works, died Nov. 3 at his farm in Dublin, Va. Prior to assuming his editorial post in 1931, he invented several chlorination devices as research engineer for the Chlorine Institute. And while with the Maryland State Department of Health he developed, in collaboration with Abel Wolman, the residual method of controlling chlorine dosage in water and sewage. In later years, he served as president of the American Water Works Association, president of the New York Sewage & Industrial Wastes Association, and as chairman of the American Society of Civil Engineers' sanitary engineering division.

John B. Conley, 79, a civil engineer who worked on the Panama Canal for two years while it was under construction, died Oct. 15 in Louisville.

Oliver J. Ripple, 70, president of Ripple & Howe, consulting engineers of Denver, died Oct. 24. He was superintendent of filtration for the Denver Water Board from 1924-1945, when he formed his firm. He had served as president and a national director for the Rocky Mountain Section of the American Water Works Association. He graduated from Colorado State University in 1909.

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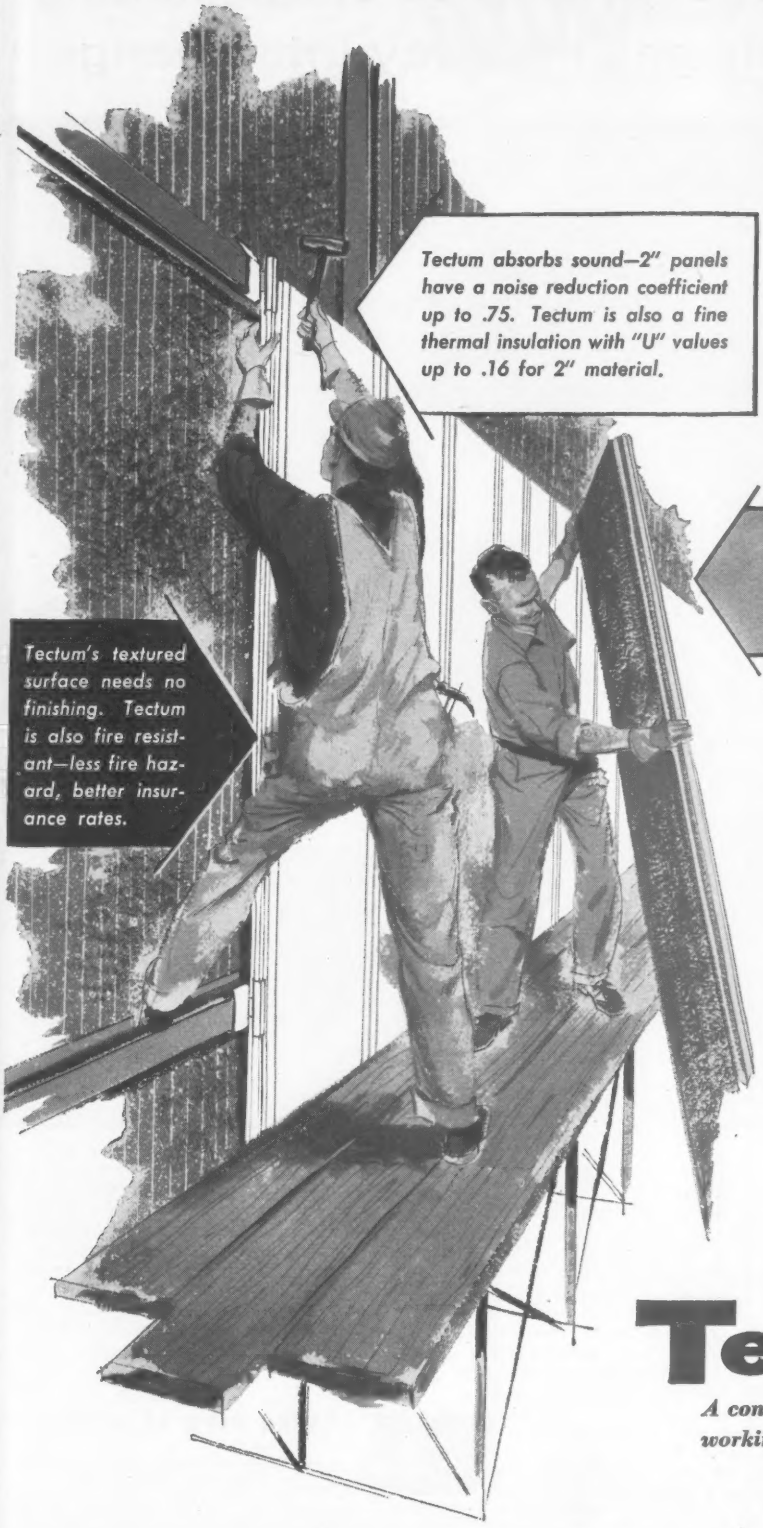

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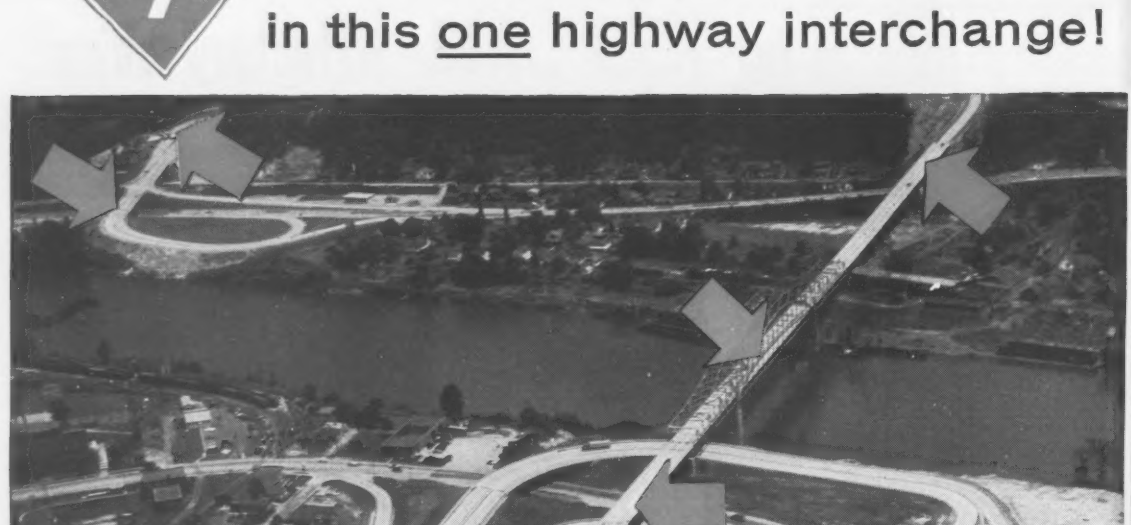

The efficiency and safety of a highway in the snow belt is no better than its provision for snow and ice removal. Scientific grades, curves, approaches, road surfaces, even vehicle tires and controls, have improved highway efficiency . . . but plowing, cindering and salting are still only half measures.

Complete "weather control" requires automatic steel pipe snow and ice melting systems . . . especially at strategic areas such as overpasses, elevated ramps and approaches, bridge floors and toll gates where stalled cars and trucks can disrupt traffic flow for miles-in-between on the passable straightways.

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Books

Plastic Design of Steel

PLASTIC DESIGN OF PORTAL FRAMES—By Jaques Heyman. 104 pp. Cambridge University Press, New York 22, N. Y. $2.

A British version of the plastic theory of steel design is presented in simple form in this book. The treatment is limited only to failure by flexure of one-story portal (gable) frames.

Plastic design theory permits an accurate estimate to be made of the load-carrying capacity of a structure before failure occurs. A safety factor is applied to the ultimate loads to determine the working loads, and under the latter, unit stresses generally are well within the elastic limit. Use of the theory not only yields more economical designs than by conventional elastic theory but usually is simpler.

Unlike most books previously published on this subject, this text is not heavy on theory; derivations of theorems generally are omitted, the reader being referred to an extensive bibliography at the back of the book. It was written to appeal to engineers in design offices.

Miscellaneous Notes

• **Atomic Energy**—The U. S. Atomic Energy Commission has issued an up-to-date 216 page compilation of information in the nuclear field. The handbook, entitled "Atomic Energy Facts", combines and organizes material from many commission sources. It discusses the peacetime use of atomic energy and is aimed to inform industrial management and others interested in atomic energy. The book, paper bound, may be purchased for $2 from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

• **Planned Public Works**—Water and sewerage projects which were planned under grants from the Housing & Home Finance Agency and are expected to be under construction in the next 3 to 5 years are listed in a survey published by the Department of Commerce. Included are 273 water projects and 1,100 sewerage projects. Estimated construction costs for each project are broken down by function (transmission, treatment, pumping, etc.). Communities are listed alphabetically by states. Although the survey presents only a segment of expected construction in these fields, the data should be useful to contractors and equipment manufacturers for planning purposes. Prepared by Walter Piction of the Water and Sew-

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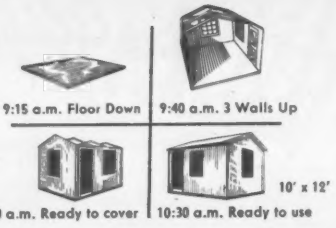

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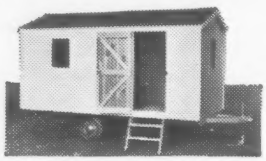

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erage Industry and Utilities Division, the survey titled "Water and Sewerage Projects in the Advance Planning on Non-Federal Public Works Programs" is available from the Department of Commerce, Wash. 25, D. C.,—25¢.

• **Combustibles in buildings**—A survey yielding information that will be useful in promoting more rational fire-protection design is reported in Combustible contents in Buildings, by S. H. Ingberg, J. W. Dunham and J. P. Thompson, Building Materials and Structures Report 149, National Bureau of Standards. Tables give the weights of combustibles found in buildings with various classes of occupancies, such as apartments, hospitals, schools, department stores, factories and warehouses. A similar survey of office buildings as reported on in 1942 (BMS 92). Data from these surveys, in conjunction with information from fire-severity tests and fires in buildings, can be used to determine minimum fire-resistance requirements. BMS 149 can be obtained for 20 cents from the Superintendent of Documents, U. S. Govt. Printing Office, Washington 25, D. C.

• **Protective lighting standard**—A new booklet, American Standard Practice for Protective Lighting, has been issued by the Illuminating Engineering Society. The booklet defines and gives the principles involved in plant protection, follows with a discussion of the laying out of boundaries and approaches to an industrial plant. It provides descriptive and application data for a variety of outdoor lighting equipment, including types of light sources, and illustrates with drawings, charts and diagrams numerous protective lighting problems. Price 50 cents a copy. Publications Office, Illuminating Engineering Society, 1860 Broadway, New York 23, N. Y.

• **Vermiculite concrete roof decks**—A report on the adequacy of vermiculite concrete as a horizontal diaphragm in buildings subject to lateral forces has been prepared by the Vermiculite Institute. The report covers a test program that demonstrated vermiculite concrete roof decks have a high safety factor in resisting earthquake loads. Vermiculite Institute, 208 S. La Salle St., Chicago 4, Ill.

• **Standpipe and inside hose systems**—A new safety code covering "Inspection, Maintenance and Protection of Standpipe and Inside Hose Systems" reviews the various services performed by a standpipe and inside hose system. Specific guidance is provided for periodic inspection of all components of the

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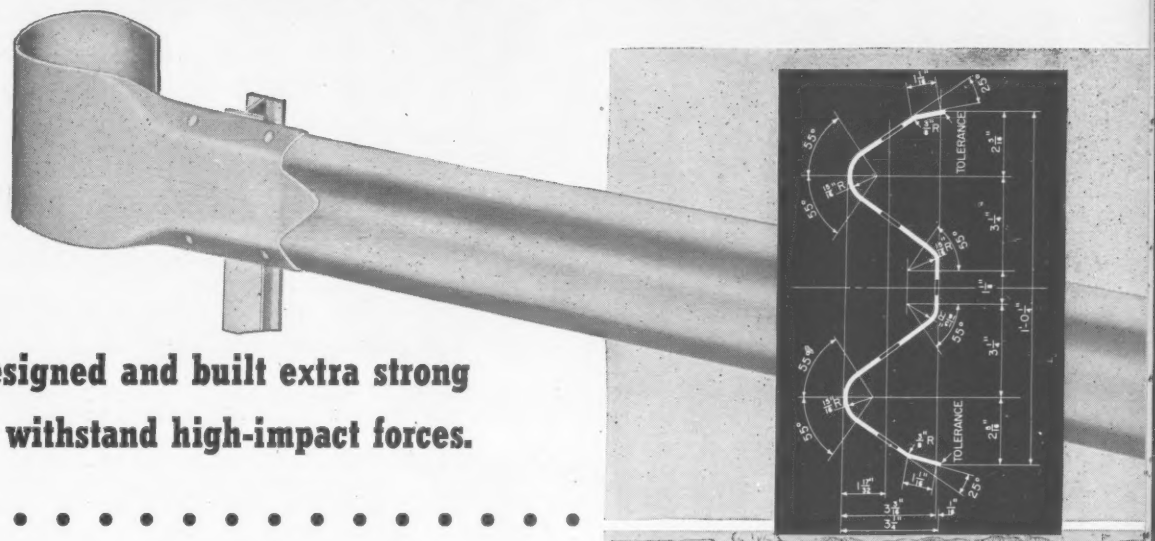

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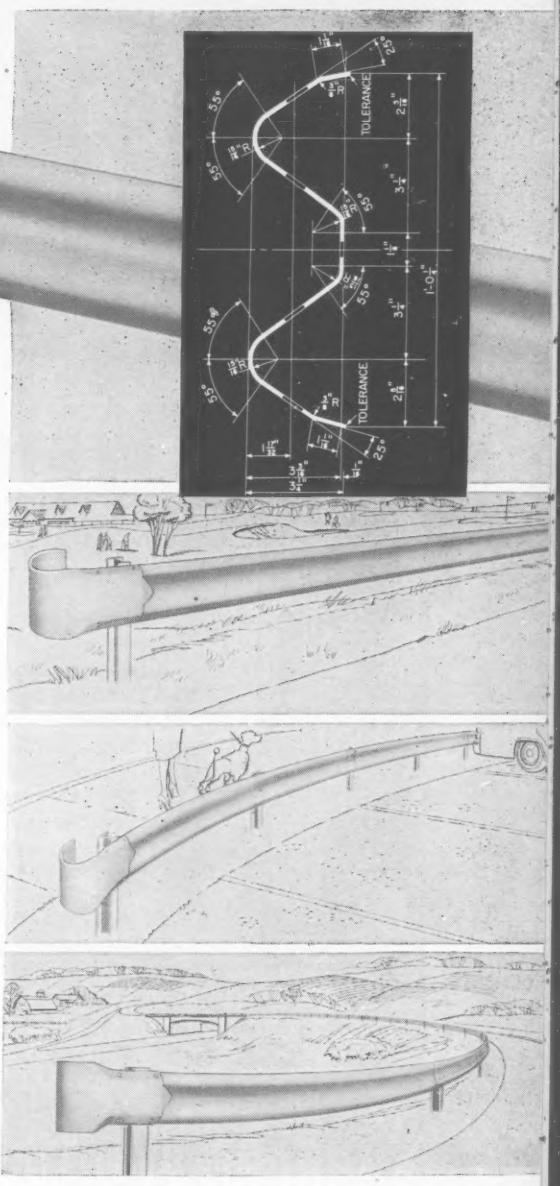

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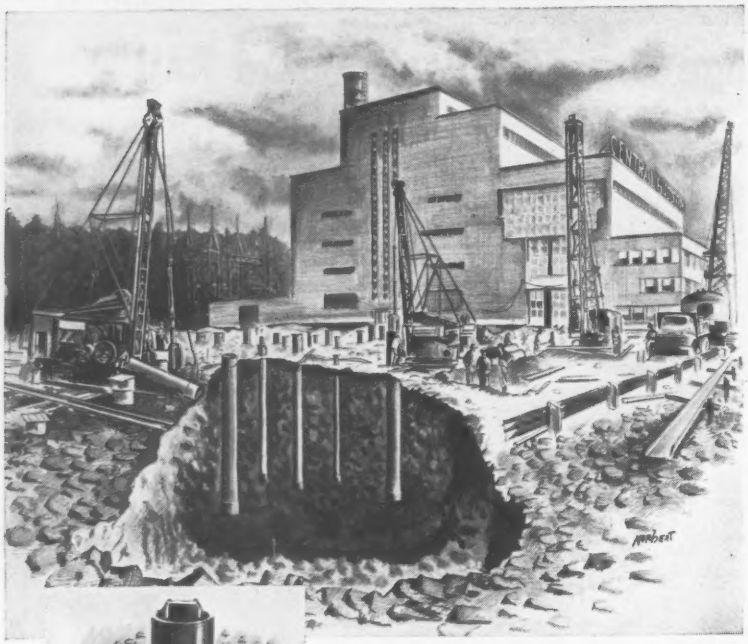

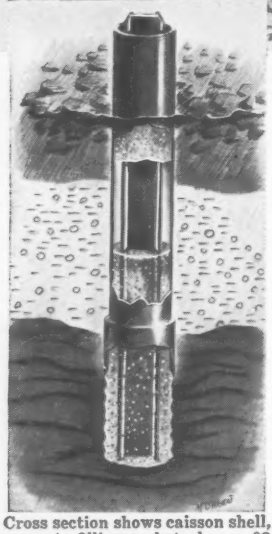

Cross section shows caisson shell, concrete filling and steel core. 92 such caissons of 24 and 30-inch diameter were drilled and driven through rip-rap and obstructions, and socketed into rock, for this power plant foundation.

Project: 3rd Unit of Steam Station at Danskammer Point, Roseton, N. Y. for Central Hudson Gas & Electric Corp.

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system. It is available without cost from Fire Equipment Manufacturers' Association, Inc., One Gateway Center, Pittsburgh 22, Pa.

• **Research reactors**—A booklet, "U. S. Research Reactors," has been made available by the Atomic Energy Commission. Data and illustrations of various types of research reactors are presented in the booklet. One or two reactors in each classification are described at length as typical examples. Over thirty research reactors are listed. Copies can be obtained for $1.50 each from the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.

• **Concrete inspection**—The 4th addition of the American Concrete Institute's Manual of Concrete Inspection contains 240 pages covering the problems and techniques of concrete inspection. It describes methods accepted as good practice. Sections on mix proportioning, winter concreting and hot weather concreting are brought up to date. Available at $3.50 a copy from the American Concrete Institute, P. O. Box 4754, Redford Station, Detroit 19, Mich.

Books and Pamphlets

PROCEEDINGS OF THE REGIONAL TECHNICAL CONFERENCE ON WATER RESOURCES DEVELOPMENT IN ASIA AND THE FAR EAST—Flood Control Series No. 9. 451 pp. International Documents Service, Columbia University Press, 2960 Broadway, New York 27. $4.50.

EARTH PRESSURES AND RETAINING WALLS—by Whitney Clark Hungtinton. 534 pp. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. $11.50.

DATA BOOK FOR CIVIL ENGINEERS—Volume II: Specifications and Costs—by Elwyn E. Seelye. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. $20.00.

NUCLEAR ENGINEERING—850 pp. McGraw-Hill Book Co., 330 W. 42nd St., New York 36. $12.50.

BASIC SOILS ENGINEERING—by B. K. Hough. 513 pp. Ronald Press Co., 15 E. 26th St., New York 10. $8.00.

ANALYSIS FOR PRODUCTION MANAGEMENT—by Bowman and Fetter. 503 pp Richard D. Irwin, Inc., Homewood, Ill $7.80.

ELEMENTS OF ENGINEERING THERMADYNAMICS—by Rolf H. Sabersky. 318 pp McGraw-Hill Book Co., 330 W. 42nd St., New York 36. $7.50.

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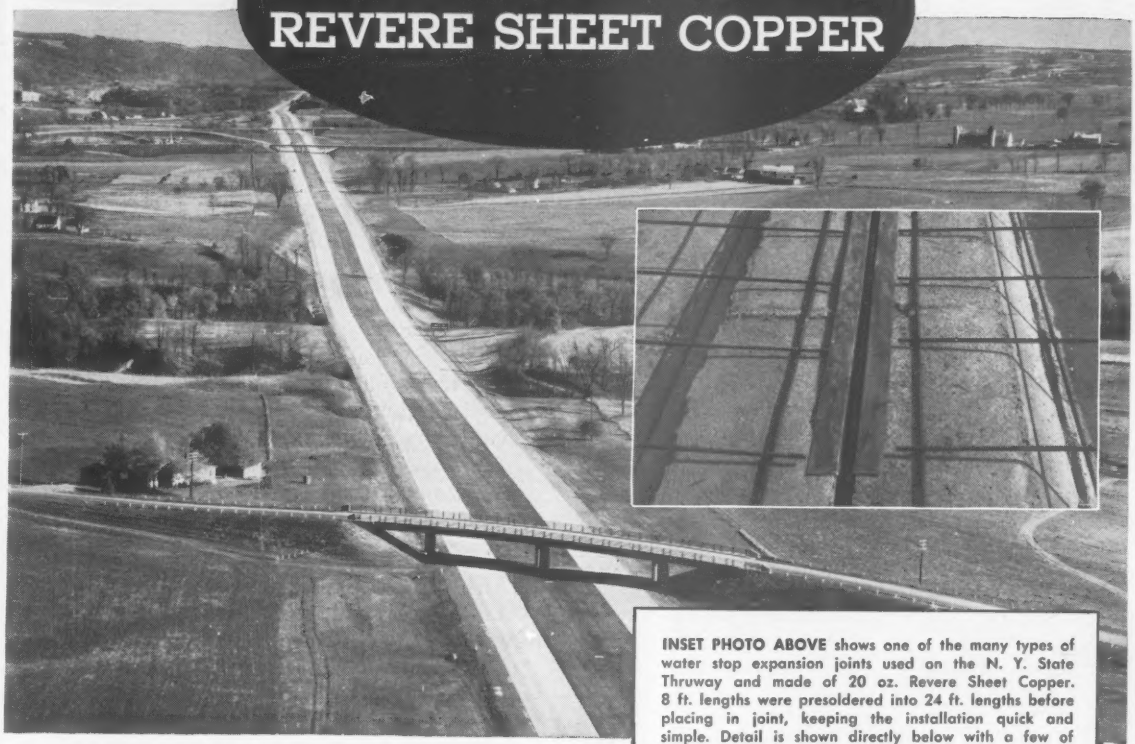
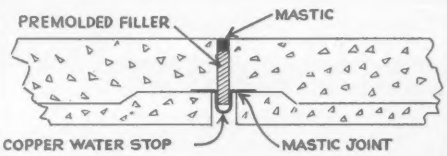
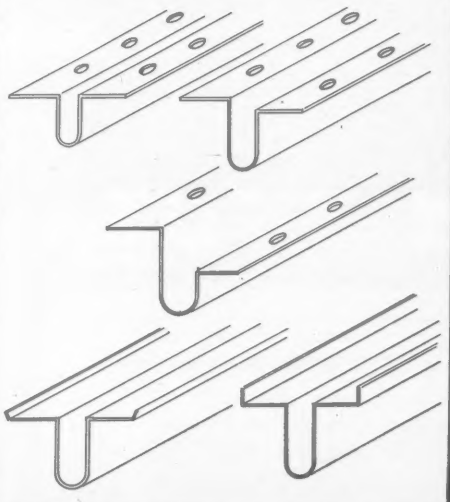


INSET PHOTO ABOVE shows one of the many types of water stop expansion joints used on the N. Y. State Thruway and made of 20 oz. Revere Sheet Copper. 8 ft. lengths were presoldered into 24 ft. lengths before placing in joint, keeping the installation quick and simple. Detail is shown directly below with a few of the many types of joints used.





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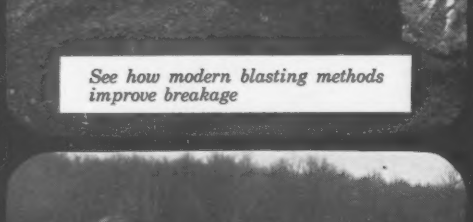

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Concealed Defects

Contractors liable for injuries from dangerous defects that are hidden

Contractors, like manufacturers with respect to their own products, are liable for injuries stemming from inherently dangerous or defective construction work. But the danger must be concealed rather than obvious.

That was the conclusion of a New York court in the following case.

Six years after an apartment house had been completed and turned over to the owner, an action was brought against the architects who designed the structure and the builder who constructed it, as well as against the owner, to recover for injuries suffered by a child of a tennant when he fell off a stoop, a built-up area at the rear entranceway to the apartment. The floor of the stoop was one step up from the concrete pavement. Two separate suits were brought, one against the Binghamton Housing Authority, the owner of the property, and the other against the architects and the builder. The Housing Authority served a third-party complaint against the builder and the architects, asserting a right of indemnification in the event of a recovery against it.

The complaint charged that the Housing Authority, the architects and the builder could be charged with knowledge that the porch would be used by infants and the structure as built created a hazardous and extremely dangerous condition in that they failed to provide a protective railing, guard, or any device whatever to protect the occupants of the house or other persons from falling off the stoop; that the rear door opened outward to the porch in such a manner that those on the porch would have to back precariously close to the edge of the stoop; and in addition, the step leading from the porch to the sidewalk was grossly inadequate in that it was located in the center of the porch and did not extend along its entire length.

The trial court dismissed the complaint against the architects and builder and the action brought by the Housing Authority against them. The Appellate Division (1 A. D. 2d 559, 152 N. Y. S. 2d 79) reversed the order dismissing the complaint against the architects and builder. An appeal was taken to the Court of Appeals and that court

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reversed the decision of the Appellate Division and reinstated the judgment rendered by the trial court.

The Court of Appeals referred to many cases where the courts have held that there is no distinction in liability of a manufacturer of dangerous materials or one who constructs a dangerous structure on real property. However, these cases only hold that the obligation is to make the product free from latent defects and concealed dangers, and in the instant case all the alleged defects in the building were obvious and the suit against the architects and the contractor was said to have no legal basis.

The counterclaim of the Housing Authority against the contractor was predicated on a provision in the contract whereby the contractor was to be the insurer of the Authority against injury or property arising out of or in connection with the performance of the work, whether sustained before or after the final payment. The Court of Appeals held that this provision of the contract could not reasonably be construed so as to require the builder to indemnify the Authority for an accident that occurred some six years after the job had been completed and accepted and did not arise from any defect in workmanship or in the material.

(1) Inman v. Binghamton Housing Authority, et al., 3 N.Y. 2d 137, 143 N.E. 2d 895, Court of Appeals of New York, July 3, 1957.

Damage Suit for Injuries Governed by Contract Law

If a contractor has indemnified the owner against damages for injuries to third persons as a result of construction work, a suit for damages is considered, in Pennsylvania, to be based on contract and not on negligence law, the result being that the six year statute of limitations and not the two year one applies.

In Philadelphia, for example, a contract for street repaving contained the following provision:

"Party of the second part (contractor) shall be alone liable and responsible for, and shall pay, any and all loss and damage sustained by any person or party either during the performance or subsequent to the completion of the work covered by this agreement by reason of injuries to person and damage to property * * * that may occur either during the performance or subsequent to the completion of the work covered by this agreement, or that may be sustained as a result or consequence there-

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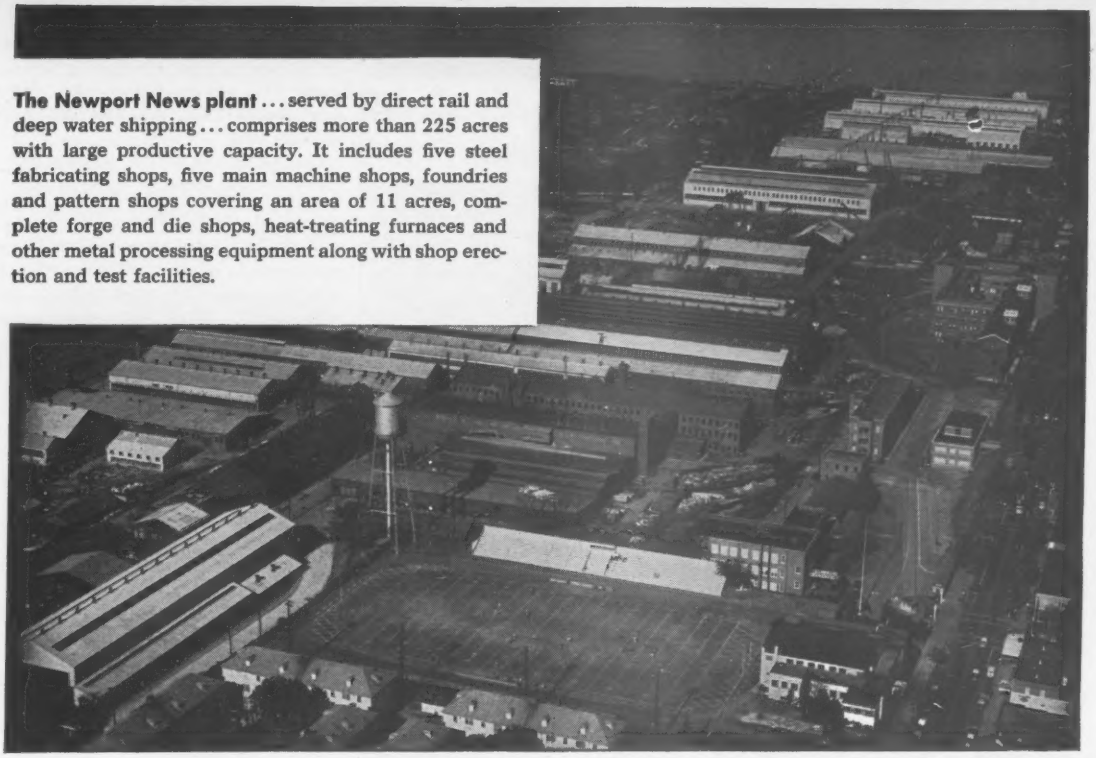

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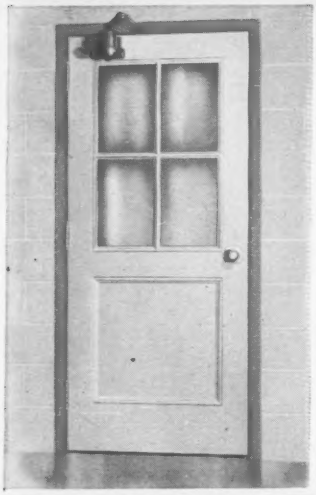

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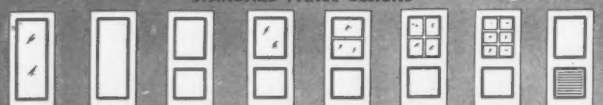

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of, irrespective of whether or not such such injuries or damage be due to negligence or to the inherent nature of the work."

In the course of the performance of the work the plaintiffs suffered personal injuries and property damage when their automobile fell into an excavation made by the contractor. An action was brought to recover for the damages. The complaint set forth two causes of action: (1) That the contractor was liable for the injuries sustained on the theory that the contract made the injured persons third-party beneficiaries, and: (2) That the injuries and damages resulted from negligent acts on the part of the contractor.

The accident occurred on April 7, 1953, and the action was brought on Oct. 19, 1955. The contractor made an application to the court to dismiss the action on the ground that, under Pennsylvania law a suit to recover damages for injury must be brought within two years from the time when the injury occurred. The court granted the contractor's application and dismissed the action. This judgement was reversed on appeal,[1] the appellate court holding that the action was brought on contract and that the six year statute of limitations applied.

(1) Thompson v. Harry C. Erb, Inc., 240 F. 2d 452, U.S. Court of Appeals, Third Circuit, Jan. 16, 1957.

An Order for Extra Work Should Be Put in Writing

Construction contracts often contain provisions to the effect that all orders for extra work shall be in writing and that a price for such extra work shall be agreed upon. Where the contract contains such a provision, most courts have held that a contractor cannot recover for extra work without a written order.

The reason for such conclusion is that the party for whom the work is being done has limited the authority of the architect to order extra work.[1]

Where, however, the extra work is ordered by the owner and the owner has full knowledge that the extra work is being performed without a written order and neither the contractor nor the owner suggested that a written order be given for such extra work, such conduct constituted a waiver of the contract requirement for a written order for the extra work.[2]

(1) United States v. Cunningham, 125 F. 2d 28 and cases there cited.

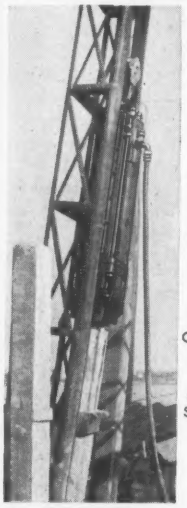
(2) Wilson v. Keefe, 309 P. 2d 516, District Court of Appeals of Calif., Apr. 16, 1957.

Unusual Pile-Driving Methods with McKiernan-Terry Hammer Used in Replacing Old Inadequate Bridge

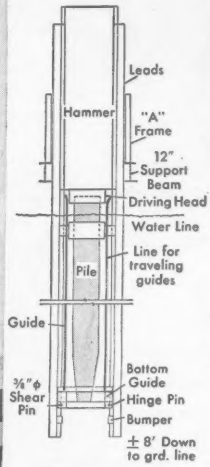
The pile-driving operations to replace the 2-lane 3-span deck truss bridge over Lake Decatur on U. S. 36 with a wider and stronger structure were all performed from the old spans. The new bridge is supported on modified bent pile abutments and solid reinforced concrete piers with concrete pile abutments.

As reported in the August 1956 issue of Roads and Streets by Varel L. Fraley, Bureau of Design, Illinois Division of Highways, who was one of the designers of the bridge, the following unusual method of driving the pier piles in 36 ft. of water was employed, using a McKiernan-Terry 10B3 Double-Acting Pile Hammer:

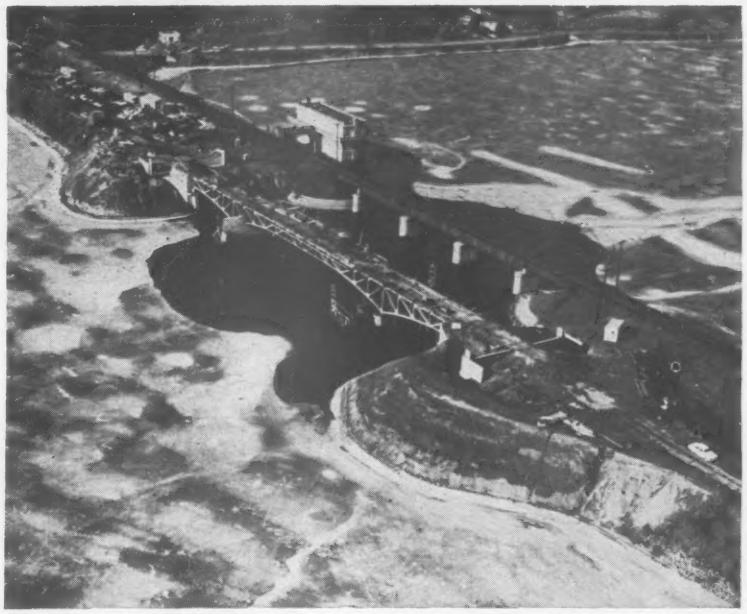
"The leads employed were 40 ft. long. An 'A' frame had been welded on either side of them, in order to allow them to rest and slide on I-beams supported by walers on either side of the cofferdams. There were 20 rows of piles in the footings with 5 piles in each row. The support beams for the leads were about 2 ft. above water line. Since about 10 ft. of the leads was above this beam, this left the bottom of leads roughly 8 ft. above ground line inside the cofferdams. The superintendent devised a system of traveling guides that fit inside the leads to hold the pile to be driven and to keep the pile perfectly vertical.



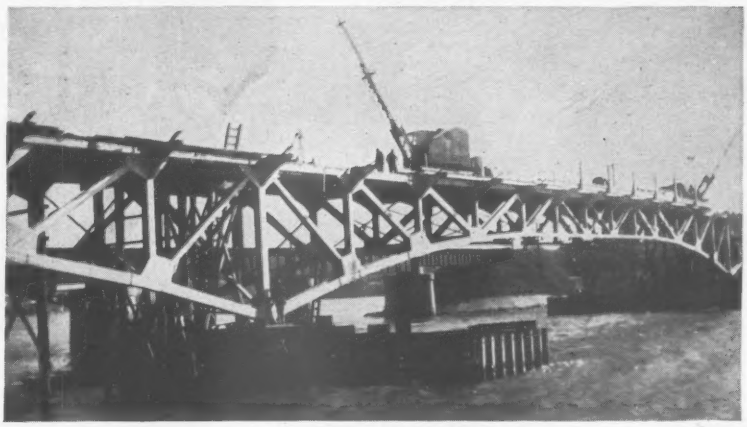
Driving the abutment piling



Sketch showing the unusual method of driving the pier piles



Aerial view during construction of the piers for the new wider bridge



Driving the cofferdam sheeting

A truck crane was used to handle these sliding guides and the piles.

". . . The hammer was set on the pile above the water line to insure it being properly seated on the pile, then guides, pile, and hammer were all lowered into the water simultaneously, using care to see that the pile remained in the driving head. The bottom guide supported the end of the pile and the weight of the hammer when the guide reached the welded channel bumpers at the bottom of the leads.

"Cables, exhaust hose on the hammer, and load lines were all given 10 or 11 ft. of slack when the bumper was reached. One blow of the hammer then sheared a ⅜-in. pin holding the bottom support for the pile in the traveling guide, and pile and hammer dropped straight down the remaining 8 ft. to ground line. Workmen then made sure everything was clear and ready to drive, and the pile was driven to bearing."

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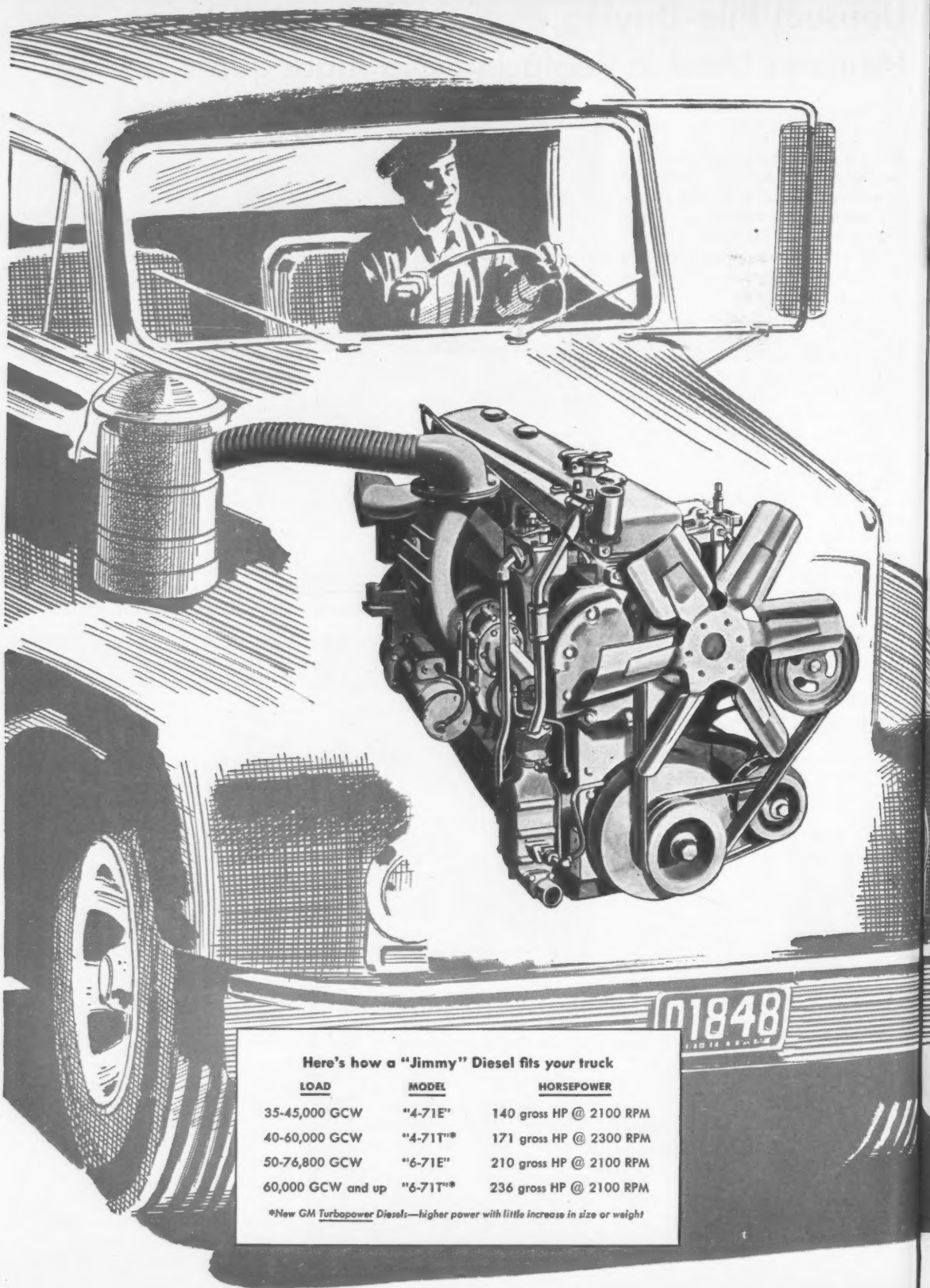
Manufacturing Engineers
80 Richards Ave., Dover, New Jersey



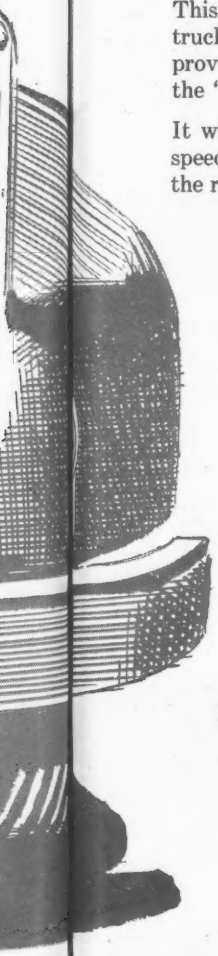
Here's how a "Jimmy" Diesel fits *your* truck

LOAD	MODEL	HORSEPOWER
35-45,000 GCW	"4-71E"	140 gross HP @ 2100 RPM
40-60,000 GCW	"4-71T"*	171 gross HP @ 2300 RPM
50-76,800 GCW	"6-71E"	210 gross HP @ 2100 RPM
60,000 GCW and up	"6-71T"*	236 gross HP @ 2100 RPM

**New GM Turbopower Diesels—higher power with little increase in size or weight*

This new "Jimmy" Diesel is available for any make truck 26,000 GVW and up

New GM "71E" Diesel can cut gasoline engine operating costs in half



This General Motors Series 71 "E" engine for trucks and buses is the newest version of the time-proved GM 2-cycle Diesel, popularly known as the "Jimmy" Diesel to users the world over.

It will save more money, perform better at all speeds and last longer than any other engine on the road today—for these important reasons:

- **Modern 2-cycle advantages** — more power per size and weight—*twice* as many power strokes per crankshaft revolution as 4-cycle Diesels—smoother running—faster accelerating—better high-altitude performance.
- **New 4-valve cylinder head** and 38% larger air intake capacity for improved combustion and the cleanest "breathing" known—smoke-free exhaust.
- **Unit fuel injection** — with new free-flow spray tips—more "go" per gallon—maximum output on minimum fuel.
- **Lower maintenance costs**—simpler design requires fewer maintenance hours, and maximum interchangeability of low-cost parts assures lowest costs over the entire life of the engine.

Here is a more compact, lighter-weight Diesel that will fit any heavy truck you own or buy—and compared to gasoline engines, *it will cut your operating costs as much as 6¢ a mile!*

See your GM Diesel distributor about repowering your present equipment. When you're in the market for new trucks, ask for this great new GM "71E" Diesel. And if the truck you choose isn't immediately available with a "Jimmy," turn your truck over to the GM Diesel distributor for a "71E" installation.

DETROIT DIESEL

Engine Division of General Motors, Detroit 28, Mich.

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario

Regional Offices:

New York, Atlanta, Detroit, Chicago, Dallas, San Francisco

Now—more than ever—*it pays to standardize on GM Diesel*

GM
GENERAL MOTORS
DETROIT DIESEL POWER

—available in 1485 applications of power equipment built by more than 175 manufacturers

Parts and Service *Worldwide*

Do You Have This PIPE PROTECTION PROBLEM?

Underground piping must be protected against destructive forces of corrosive soils and electrolytic conditions. Normally, coal tar coating as called for in AWWA specifications C-203 and C-204 would be hot-applied at a coating mill. However, there are times when the volume of pipe involved or the distance of a coating mill make this impractical from a time and cost standpoint.

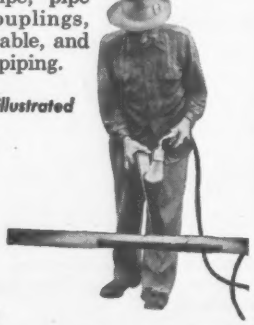
You'll find the ANSWER with TAPECOAT®

. . . the Quality Coal Tar Coating in Tape Form

TAPECOAT is the widely-accepted alternate material that is equivalent to mill-applied hot coal tar protection. With this easy-to-use material, protection can be applied in the field by your own men, because technical know-how, kettles and special crews are not required. You save time and money while providing the long-life protection called for.

TAPECOAT is easily applied, using a torch to soften or bleed the pitch which gives both bond and protection. Available in widths from 2″ to 24″, it is spirally wrapped or cigarette wrapped around pipe, pipe joints, couplings, conduit, cable, and insulated piping.

Write for illustrated brochure.



The TAPECOAT® *Company*

Originators of Coal Tar Coating in Tape Form

**1551 Lyons Street
Evanston, Illinois**

Aeronautical Engineering Research Building, Ohio

This maximum security building, with portions open to the public, will be at Don Scott Field, Ohio State University, Columbus., the university architect in charge of construction.

To house laboratories and offices for research in aeronautical engineering it will be 44 ft by 110 ft with a clear height of 9 ft 6 in., floor area 4,840 sq ft, cube 60,000 cu ft. Utilities will be brought from another building 180 ft away, all through the same ditch. Electric and phone lines will be in fiber conduit, concrete encased. The steam line and return will be in Gilsulate. Concrete is 1:2¼:3¾ mix, 6 sacks of cement per yard, minimum strength 3,000 at 28 days.

Wages in this area include: bricklayers $3.65 + 7½¢ fringe benefits, carpenters $3.15 no fb, structural ironworkers $3.35 + 7½¢, common labor $2.25, electricians $3.41, plumbers $3.40.

The general contract at $47,227 went to Kent Bros. Construction Co., Columbus; plumbing and heating to Wm. R. Evans Plumbing & Heating Co., and electrical work to Electrical Contractors, Inc.

Unit and ratio costs are:

Bids: 7-23-57 Items	Contract	Costs %	Ratio Unit Costs $/sq ft 4,840 sf	$/cu/ ft 60,000 cf
General	$47,227	67.0	$9.76	$0.787
Plumbing & Heating	10,764	15.3	2.22	0.179
Electric	12,500	17.7	2.58	0.208
Total	$70,491	100.0	$14.56	$1.175

Completion Schedule: October 1957 to April 30, 1958
Liquidated Damages: $10.00 per day

Interstate Highway and Bridges in New Hampshire

This 1.42 mile section of Interstate Route 3 from Concord to Lebanon, N. H. is a 4 lane, hot asphaltic concrete, separated highway with 40 ft median. Contract for $1,012,108 to R. G. Watkins & Son., Inc., Amesbury, Mass., includes two 3-span steel beam bridges 169 ft and 147 ft long and an interchange. The route is on a new location with limited access right of way. Work is for the State Department of Public Works and Highways at Concord, M. J. Chase, design engineer, C. J. Downing, construction engineer. Fay, Spofford & Thorndike, Inc., Boston, are consulting engineers on design.

The low of seven bids is 1% under the closest bidder and 8% under the engineer's estimate. The contractor furnishes all materials. Class A concrete requires 6.0 bags per cu yd and must test at 3,000 lb. Class AA concrete takes 6.4 bags per yard and must test also at 3,000 lb.

Minimum wage rates range from $1.70 for common labor to $2.60 for semi-skilled and $3.50 per hour for skilled.

The bidding included

1C	R. G. Watkins & Son; Inc., Amesbury, Mass.	$1,012,108
2	Suburban Excavators Inc., Wakefield, Mass.	1,022,305
7	Charter Oak Constr. Co., Inc., Hartford, Conn.	1,126,198
EE	Dept. Pub Wks & Hyws, NH, & Fay, Spofford & Thorndike, Inc., Boston, Mass.	1,100,100

Bids: 6-7-57 Items	Unit	Quantity	Unit Prices 1C	2
Clear & grub	ac	48	$500.00	$485.00
Remov old road surf	sy	1,100	0.10	0.15
Excavation, earth	cy	122,000	0.45	0.55
ledge	cy	1,400	2.30	4.00
R, earth trench cl A	cy	2,250	1.70	1.70
cl B	cy	300	1.75	4.00
R ledge trench	cy	510	8.00	8.00
uncl structure	cy	1,062	2.75	1.50
uncl structure	cy	1,482	1.75	2.00
uncl structure	cy	1,593	1.75	2.00
Borrow, earth	cy	114,000	0.46	0.55
sand	cy	24,000	0.55	0.66
Gravel	cy	54,000	0.80	0.75
backfill	cy	250	1.50	2.00
overhaul	Cym	40,000	0.10	0.10
crushed	cy	26,000	1.45	1.50
Asphalt surf treat. cl A	al	103,000	0.21	0.25
Hot asph conc ty II, pave	t	8,280	8.25	8.50
wearing course	t	400	18.00	20.00
base	t	8,930	8.00	8.35
Conc cl A, above footings	cy	500	52.00	46.00
approach slabs	cy	247	28.00	25.00
above footings	cy	845	50.00	46.00
above footings	cy	215	50.00	55.00
footings	cy	1,112	32.00	30.00
cl AA, deck slab	cy	335	62.00	55.00
deck slab	cy	368	62.00	55.00
Steel reinf	lb	178,500	0.125	0.13
steel reinf	lb	237,400	0.125	0.13
steel reinf	lb	55,600	0.125	0.135
Steel struct, bridge 147′	ls	job	48,540	50,000
169′	ls	job	62,360	63,000
Shoes, bridge 147′	ls	job	7,500	7,500
169′	ls	job	7,000	7,000
Masonry mortar rubble 12″	cy	25	42.00	50.00
RCPSS 12″	lf	2,908	3.75	3.55
15″	lf	1,252	4.25	4.00
18″	lf	404	4.90	5.00
24″	lf	252	8.00	7.25
RCPSS 30	lf	972	10.00	10.00
RCPES 30	lf	156	11.20	11.00
CMP, bit ct, 12″	lf	84	3.60	4.00
15″	lf	32	4.40	4.50
18″	lf	100	5.50	5.50
Bridge railing E, type 1	lf	1,356.5	14.00	15.00
type 2	lf	113.8	14.00	15.00
Waterproofing, membrane	sy	3,730	2.00	2.00
Rip Rap E	cy	825	25.00	26.00
CMP bit ct perf, underdrain, 6″	lf	8,500	2.50	2.50
15″	lf	1,544	4.75	4.30
Granite Curb C, straight	lf	5,375	2.70	2.35
curved	lf	60	6.50	10.00
D, straight	lf	3,880	3.25	3.20
curved	lf	35	6.50	10.00
bridge, straight	lf	1,232	4.50	4.25
Guard rail, multi-cable, std	lf	7,400	2.20	2.10
beam	lf	324	4.00	3.25
Anchorages	ea	50	55.00	55.00
Post markers	ea	120	8.00	8.50
Catch basins type B	ea	21	210.00	200.00
C	ea	2	210.00	200.00
Drop inlets type D	ea	9	205.00	200.00
E	ea	20	210.00	200.00
F	ea	26	210.00	200.00
G	ea	3	210.00	200.00
Manholes MH-1	ea	2	250.00	225.00
Granite curb inletstp B	ea	41	32.00	29.00
Curb board	lf	1,000	0.35	0.45
Asphalt gutter	sy	100	4.50	4.50
Asphalt sluice	sy	50	4.50	4.50
Fence, stock wire, galv posts	lf	19,400	0.70	0.58
gates	ea	4	60.00	55.00
Uniformed officers	hr	750	2.50	2.50
Project markers	ea	1	25.00	35.00
Maint traffic	unit	1	15,000	7,500
Loam, 4″ deep	sy	32,800	0.45	0.25
Fertilizer	lb	8,900	0.10	0.10
Grass seed		370	2.00	2.20
Mulch		40	75.00	75.00
Calcium chloride	to	30	60.00	65.00
Water	unit	1,500	2.00	2.25
Bounds furn & set	ea	50	23.00	22.00
Asph cutback pretreat	gal	550	0.40	0.25
Seal ct, shoulders...aggreg		260	6.50	7.00
asph cutback	gal	4,100	0.25	0.22

Completion Schedule: June, 1957 to July 1, 1959

Precast and prestressed concrete units manufactured and erected by:
Edward Campbell Co., Vineland, N. J.
Contractor: N. J. Post Construction Co., Oaklyn, N. J.
Architect: Philip R. Soloway, Vineland, N. J.
Consultant Designers: M. Saphier Associates, Inc., New York City

Precast concrete construction *throughout . . .*

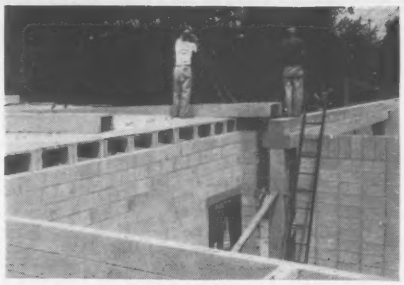
The growing trend toward precast concrete is illustrated by this new Beth Israel Synagogue and School at Vineland, New Jersey. From standard concrete block to huge 60 ft. prestressed double tees, precast concrete serves both architecturally and structurally.

In precasting these units, the Edward Campbell Company used Lehigh Early Strength Cement for maximum production efficiency and economy. For example, in making the double tees, they used Lehigh Early Strength Cement and hot water curing. Result: early removal of units and reuse of forms in less than half the time required with regular portland cement.

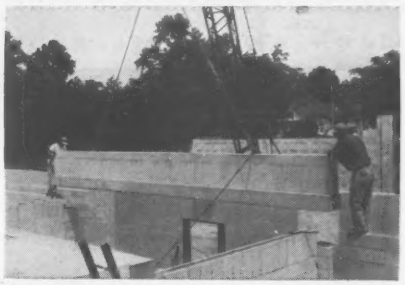
This is typical of the advantages of Lehigh Early Strength Cement in modern concrete construction.

LEHIGH PORTLAND CEMENT COMPANY

ALLENTOWN, PA.

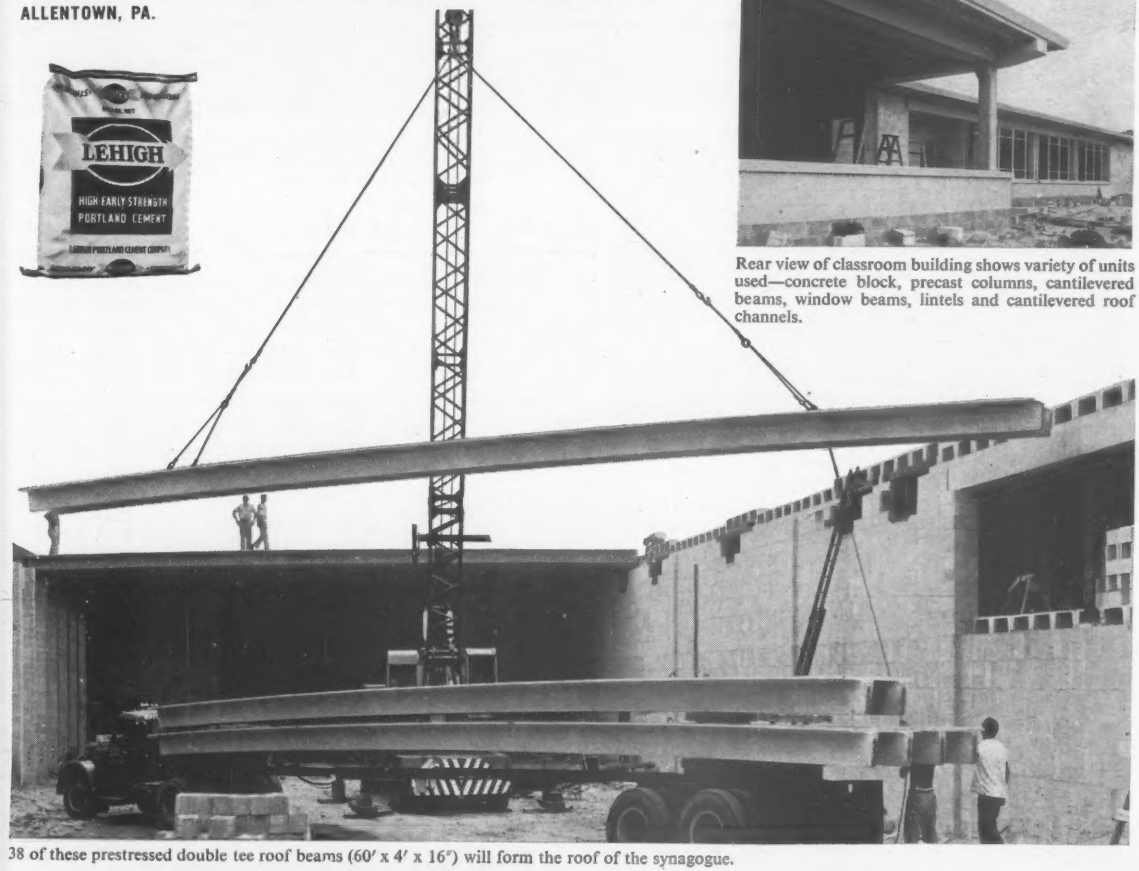


Placing one of the 440$_4$"Clearspan" channels in the roof of the classroom building.



This inverted tee beam, 2′10″ deep x 27′ long, was especially cast for the job. Note extensive concrete masonry in common, stack and ashlar patterns. Load bearing walls include pilaster and bond beam block.

Rear view of classroom building shows variety of units used—concrete block, precast columns, cantilevered beams, window beams, lintels and cantilevered roof channels.



38 of these prestressed double tee roof beams (60′ x 4′ x 16″) will form the roof of the synagogue.

Materials and Labor Prices

Market Quotations by ENR Field Reporters

See following ENR issues for OTHER PRICES:

- Wood Products, Glass, Explosives, Chemicals: Last, Oct. 24; Next, Nov. 21
- Clay Products, Lime, Plaster, Paint; Roofing: Last, Oct. 31; Next, Nov. 28
- Wage Rates, Building Board, Lath, Insulation: Last Oct. 31; Next, Nov. 28
- Cement, Aggregate, Ready-Mixed Concrete, Asphalt: Last, Nov. 7; Next, Dec. 5

IRON AND STEEL PRODUCTS—PER 100 LBS. BASE MILL PRICES

	STRUCT SHAPES— CARBON STEEL	PLATE CARBON STEEL	REINF BARS* billet	RIVETS ½-in. struc- tural	SHEET PILING Base	STEEL RAILS Per Net Ton Standard	STEEL RAILS Per Net Ton Light	TRACK SUPPLIES Angle Bars	TRACK SUPPLIES Std Spikes	TRACK SUPPLIES Tie Plates	TRACK SUPPLIES Track Bolts
Birmingham Area	$5.275	$5.10	$5.425	$12.25	.....	$110.50	$130.00	$6.975	$9.75	$6.60	.....
Chicago Area	5.275	5.10	5.425	12.25	$6.225	110.50	130.00	6.975	9.75	6.60	.....
Pittsburgh Area	5.275	5.10	5.425	12.25	6.225	110.50	130.00	6.975	9.75	6.60	$14.75
Buffalo Area	5.275	5.10	5.425	12.25	6.225	110.50	130.00	6.975	9.75	6.60	14.75
Cleveland	.....	.....	5.425	12.25	6.225	.....	.....	.....	.....	.....	14.75
Youngstown Area	.....	.....	5.425	.....	.....	.....	.....	.....	9.75	.....	.....
Geneva	5.275	5.10	.....	.....	.....	.....	.....	.....	.....	.....	.....
Los Angeles	5.975	.....	6.125	.....	6.225	.....	.....	.....	9.75	6.75	.....
Pueblo	.....	.....	.....	.....	.....	.....	.....	69.75	9.75	6.60	.....

* Fairless Works, $5.575.

IRON AND STEEL PRODUCTS—F.O.B. WAREHOUSE, PER 100 LBS., BASE PRICE

	STRUCTURAL SHAPES Per 100 lb. base price	REINFORCING BARS Per 100 lb., base price 5 tons to carload lot New billet	REINFORCING BARS Per 100 lb., base price 5 tons to carload lot Rail steel	EXPANDED METAL LATH Per 100 sq. yd., carload lots Std. diamond mesh. 3.4 lb.	EXPANDED METAL LATH Per 100 sq. yd., carload lots Std. ribbed 3.4 lb.	WELDED FABRIC REINFORCING Per 100 sq ft., carload lots fob mill
Atlanta	$5.74	9.25	$8.43‡	$52.00	$57.00	
Baltimore	9.45	8.45j	.....	42.00	46.50	
Birmingham	8.64f	8.60f	8.60f	66.25p	71.00p	
Boston	9.63a	8.25	8.25	46.50	51.00	
Chicago	8.79E	6.91gu	6.91gu	52.00‡	63.00‡	
Cincinnati	9.18ak	9.08rs	.....	43.50mn	48.00mn	
Cleveland	9.01	8.89c	.....	44.50‡	49.00‡	
Dallas	10.25	8.85	8.85	61.00	66.50	
Denver	9.82	8.95c	.....	57.00n	63.00n	
Detroit	9.18	7.15g	.....	45.00	49.50	
Kansas City	9.31a	8.10	.....	49.00	60.00	
Los Angeles	9.35fd	7.35	.....	58.50	64.50	
Minneapolis	9.08d	9.26b	9.26b	41.50	46.00	
Montreal	8.25-9.00kC/8.30-8.70A	7.75/9.95F	7.75/9.95F	65.00A	70.20A	
New Orleans	.....	7.70gks	.....	45.50	50.00	
New York	9.45a	8.35y	8.35y	50.50n	57.00no	
Philadelphia	8.80/9.00	7.80/8.00	.....	42.50‡	47.00‡	
Pittsburgh	8.64f	7.10t	.....	46.00‡w	49.50‡w	
St. Louis	9.10e	8.45c	8.45c	61.00l	62.00l	
San Francisco	9.50	9.45j	.....	51.00	54.00	
Seattle	9.80D	8.85e	.....	62.00nr	68.00nr	
Toronto	8.85*	7.85	7.85	59.50nq	62.75nq	

EXTRAS, per cwt—◆Quantity (applies to LCL shipments only): under 1,000#, +$1.80; 1000-1999#, +$1.20; 2000-4999#, +$0.80; 5000-9999#, +90¢; 10,000-19,999#, +60¢; 20,000-29,999#, +30¢; 30,000-39,999#, +10¢; 40,000# & up, none. ◆Size†: #2 #9, #10, #11 +50¢. ◆Bending: heavy, +90¢; light +$2.20 (except in New York City and surrounding metropolitan area where bending must be done on the job). ◆Engineering (details and placing from designs by others): over 500 tons, +45¢; 200-499 tons, +50¢ but not over $1500; 75-199 tons, +65¢ but not over $3000; 20-74 tons, +75¢ but not over $975; 5-19 tons, +85¢ but not over $300; under 5 tons, +$1.00 but not over $85. Min. charge $26. Design only: +60¢.

Quantity extras, per cwt: under 100#, +$9; 100-399#, +$6; 400-999#, +$3.80; 1000-1999#, +1.00; 2000-4999#, base price; 5000-9999#, −10¢; 10,000-19,999#, −30¢; 20,000-29,999#, −60¢; 30,000# and up, −70¢

4 × 16 in., No. 5 & 10 wire— Joliet, Ill., Donora, Pa., Monessen, Pa.: $3.98

4 × 12 in., No. 8 & 12 wire— Joliet, Ill., Donora, Pa., Monessen, Pa.: $3.63

6 × 6 in., No. 6 & 6 wire— Joliet, Ill., Donora, Pa., Monessen, Pa.: $4.17

*‡ Delivered. *• Aver. of Canadian & American. *a 2000-9999#. *b 10,000-15,999#, fob city *c 20 tons or over *d 10,000-19,999# *e Intermediate struct'l *f Incl. delivering in free zone *g CL *h list price; dominion tax exempt; add provincial and municipal taxes *i add dominion, provincial and municipal sales taxes *j intermediate and hard grade *k fob city *l delivered; contractor to do unloading *m copper alloy *n LCL *o asphalt coated *p del. of 500 sq. yd. or more. *q 3 lb *r 2% off for cash *s 2,000-4,999# *t add 15¢ del. *u add 6.25¢ switch *v incl 15¢ del. *w truck lots. *y add 15¢ del. *z add 10¢ del. *A American made. *C Canadian made. *D ½% for cash. *E 30,000# or over. * F Federal tax exempt.

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE PRICE INDEXa	ASBESTOS CEMENT PIPE per lin. ft. f.a.b. city 6" Pr Cl. 150	ASBESTOS CEMENT PIPE per lin. ft. f.a.b. city 12" Sew Cl. I	CLAY SEWER PIPE Per ft., delivered ASTM C13-54 8 in.	CLAY SEWER PIPE Per ft., delivered ASTM C13-54 12 in.	CLAY SEWER PIPE Per ft., delivered ASTM C200-55T 24 in.	CLAY SEWER PIPE Per ft., delivered ASTM C200-55T 36 in.	CLAY DRAIN TILE† Per 1,000 ft., car load lots, f.o.b. ASTM C4-55 6 in.	CLAY DRAIN TILE† Per 1,000 ft., car load lots, f.o.b. ASTM C4-55 8 in.	CONCRETE SEWER PIPE§ Per ft., delivered ASTMC 14-55 12 in.	CONCRETE SEWER PIPE§ Per ft., delivered ASTMC 14-55 24 in.
Atlanta	130.5	$1.64	$2.68	$.53	$.98	$.....	$.....	$334.00z	.....	$1.55m	$4.40m
Baltimore	140.4	1.64	2.48	.665	1.28	5.08z	12.71	187.80	$289.20	1.01	2.75m
Birmingham	125.8	1.64	2.68	.46	.86	3.70w	10.37w	260.00‡	440.00‡	1.25m	2.75
Boston	143.5	1.66	2.46	.826qrt	1.593qrt	6.615qrt	.....	215.40r	330.60r	1.56mg	3.47mg
Chicago	140.9	1.64	2.46	.93m	1.78m	7.52m	21.16m	220.00n	330.00n	1.30	4.00
Cincinnati	135.5	1.66	2.55	.665t	1.282St	4.905t	12.505	240.00	370.00	.85m	3.25m
Cleveland	141.7	1. 66	2.55	.567z	1.0935z	4.545t	11.7875t	155.40m	240.60m	.85m	3.50m
Dallas	137.8	1. 66	2.80	.439	.799	4.00b	9.17b	.....	....	1.04	2.10
Denver	148.2	1. 73	2.80	.47n	.84n	3.73n	.....	.....	....	.75m	2.75m
Detroit	142.1	1.66	2.55	.90n	1.70n	6.80n	18.50n	164.80m	254.20m	1.10	4.05
Kansas City	138.5	1.66	2.55	.61	1.105	4.47	11.56	275.00	485.00	.95	2.90
Los Angeles	148.6	1.73	2.46	.74l	1.61l	6.42l	15.36l	370.00l	530.00l	1.12	3.32f
Minneapolis	149.9	1.66	2.66	.86me	1.55me	6.70me	.....	.....	.....	2.13h	5.74h
Montreal	.....	.....	.....	1.07u	1.90u	6.80u	12.50u	288.00	545.00	1.17h	3.11j
New Orleans	133.3	1.64	2.68	.528	.963	5.10	.....	210.50p	468.00	.85	2.90
New York	138.7	1.66	2.46	1.02	1.94	7.56	19.48	.....	.....	1.50	3.00
Philadelphia	138.0	1.64	2.46	.68	1.31	5.13z	14.25z	300.00‡	350.00‡	1.75h	4.20h
Pittsburgh	142.9	1.66	2.46	.595m	1.15m	4.78m	12.40m	190.00	295.00	1.48z	3.50z
St. Louis	136.9	1.64	2.55	.59	1.08	4.45	10.80	180.00l	380.00l	1.45il	3.10il
San Francisco	148.6	1.73	2.46	.78d	1.69d	6.72d	16.36d	320.00l	560.00l	1.05m	3.30m
Seattle	149.0	1.73	2.46	.67b	1.33b	6.84	.....	220.00c	.....	1.10k	3.25k
Toronto	.....	.....	.....	.76	1.42S	6.00	.....	157.00	280.00	1.02	3.57

*† Extra quality *§ extra strength. *‡ delivered. *a PRICE INDEXES for CENTRIFUGAL CAST IRON PIPE (Include carload freight allowed to city). These also serve as the HISTORICAL RECORD of THE $ PER NET TON PRICE of CLASS B, B&S, PIT CAST IRON PIPE. F.O.B. Foundry Price Indexes Birmingham, Ala., 125.8; Burlington, N. J., 134.8. *b Extra strength. *c 4-in., $130. *d SS361-A *f 21 in. *g culvert pipe; reinf., ASTM C 75-56 *h reinf., ASTM C 75-54 *i reinf., ASTM C 76-54 *j centrispun; no standard specs. in Canada. *k 2% cash *l fob plant *m truck del. *n LCL del., fob truck *o listed price based on LCL (no min.) *p freight allowed to destination in city *q ASTM C 13-40 *r CL fob origin, freight allowed *s 1 ft lengths *t 3 ft lengths *u CESA A 60-1941 *v standard strength *w SS; add 20% for d.s. *x fob city

*WROUGHT STEEL PIPE (Full standard weight) Discount from list; see footnote

Mill	Butt Weld 2½ & 3 in. Black %	Butt Weld 2½ & 3 in. Galv. %	Lap Weld 3½ to 6 in. Black %	Lap Weld 3½ to 6 in. Galv. %
Lorain, Ohio	16.75	3.00	6.25a	+8.00a
Aliquippa, Pa.	16.75	3.00	0.25a	+16.50
Sparrows Pt., Md.	14.75	1.50		
Benwood, W. Va.	16.75	0.50	6.25	+5.25a
Youngstown, O.	16.75	0.50	10.50ab	+11.50a
Indiana Harbor, Ind.	15.75	0.50		
Sharon, Pa.	16.75	0.50	6.25a	+10.50a
Wheatland, Pa.	16.75	0.50	4.50d	+9.75d
Etna, Pa.	16.75	3.00	+7.25ab	+24.00ab
Fontana, Calif.	3.25	+13.00		

†Threaded and coupled. weld. 8 and 9 in. 10 to 12 in. a 3½ to 4 in. b Continuous

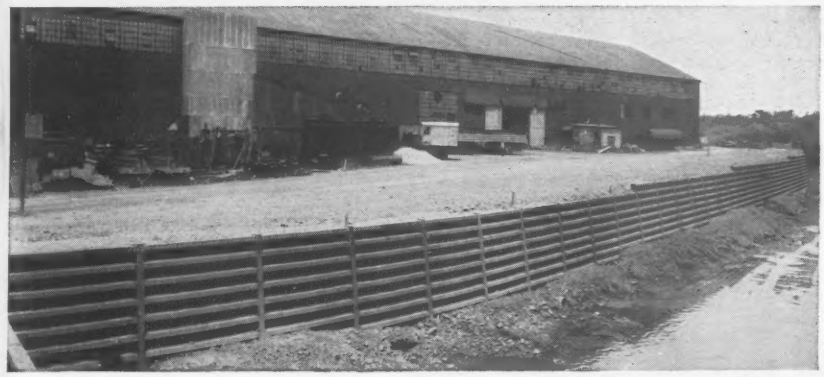
* WROUGHT STEEL PIPE: Deduct discounts shown above from the following standard list consumers carload prices to get mill price. List prices per ft.(*based on approx. $200 per net ton): Butt Weld ⅛ in., 5½¢; ¼ in., 6¢; ⅜ in., 6¢; ½ in., 8½¢; ¾ in., 11½¢; 1 in., 17¢; 1¼ in., 23¢; 1½ in., 27½¢; 2 in., 37¢; 2½ in., 58½¢; 3 in., 76½¢. Lap Weld 3½ in., 92¢; 4 in., $1.09; 5 in., $1.48; 6 in., $1.92. Add freight, 3% transport tax for destination price.

WROUGHT IRON PIPE: List prices per ft. same as for wrought steelpipe, but add following "discounts" to get Pittsburgh mill price: Butt Weld—1 in. black, + 66.54, galv. + 95.77; 1¼ in. black, + 65.54, galv. + 95.23, 1½ in. black, + 61.79 galv. + 91.22; Lap Weld —2½ in. to 3 in. black + 67.95 galv. + 95.77; 4½ in. to 6 in. black + 84.74 galv. + 90.8 Add freight rates plus 3% transportation tax to get destination price.

Plant Gains 5/8-Acre with an Armco Retaining Wall

READY

This is the bank of the creek bordering the property of Industrial Forge & Steel, Inc., ready for assembly of an Armco Retaining Wall that will gain land for an expansion program.



DONE

Job is complete, and the plant has gained more than half an acre from a formerly unusable stream slope. Also, the site is more attractive.

Industrial Forge & Steel, Inc., Canton, Ohio, needed more space for a plant expansion program. One way this could be done without the outright purchase of additional land was to reclaim the slopes of a creek bordering the property. But was this possible?

The Consulting Engineer recommended an Armco Bin-Type Retaining Wall to handle the job. With this prefabricated metal wall, installation could be made at the edge of the stream. And since the wall would rise almost vertically, the plant could make full use of the area.

The Armco Wall specified was 380 feet long, with heights ranging from 13⅓ to 21⅓ feet. The bank of the stream was cleared of brush, and excavation was made for assembly of the Armco Wall in position. Sections of the wall were bolted together, and the bins were filled with earth. To solve subdrainage problems, perforated pipe was installed behind the wall, with outlets emptying into the creek.

* * *

Armco Bin-Type Retaining Wall is one of more than 30 Armco products used in engineering and construction for industrial, municipal, highway and railway applications.

BEFORE Same location, before work began. The plant of the Industrial Forge & Steel, Inc., can be seen only dimly through the brush at the edge of the stream.

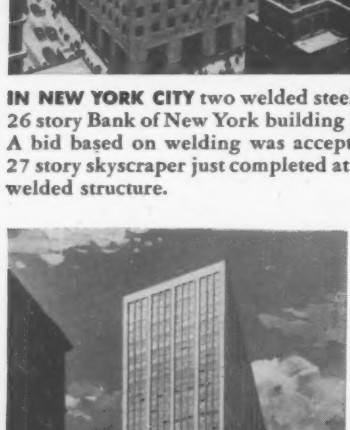
Consulting Engineer: Carl F. Schoenbaum, Canton, Ohio

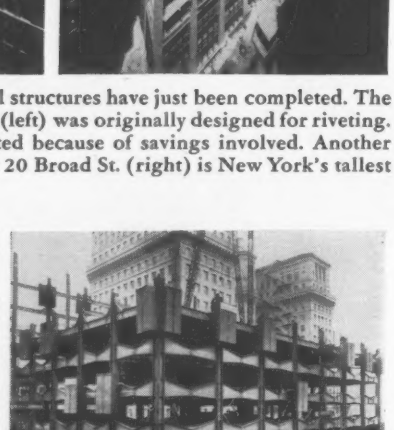
Write us for specific data. Armco Drainage & Metal Products, Inc., 5807 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

Armco Construction Products

ARMCO®

IN NEW YORK CITY two welded steel structures have just been completed. The 26 story Bank of New York building (left) was originally designed for riveting. A bid based on welding was accepted because of savings involved. Another 27 story skyscraper just completed at 20 Broad St. (right) is New York's tallest welded structure.





IN SAN FRANCISCO the 25 story, welded Equitable Life Assurance Building is the city's first skyscraper since the enactment of its earth-quake-minded building code in 1949. Unusual butterfly spandrels and tapered columns were utilized to earth-quake proof this building.

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J. A. MAHONEY, M. WETZEL, M. E. SCIORRA, D. TARTAGLIA, Reports
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

HEAVY CONSTRUCTION—BA

▲ **R. I., Hillsgrove**—TERMINAL BLDG.—BA 12/4—State R. I. & Prov. Plants, Div. Purchase, State House, Providence, terminal bldg. at Theodore Green State Airport. $1,500,000. Plans deposit $50. Chapman, Evans & Delahanty, 50 Broadway, New York, N. Y., archts. Frank L. Ehasz, Assoc., 4029 27th St., Long Island City, N. Y., consult. engrs.-proj. mgr. CD 2/25.

BUILDINGS—BA

Mass., Marblehead—CHURCH—BA 11/20—St. Stephen's Methodist Church, Rev. Albert S. Dristol, pastor, Marblehead, church, near Tents Corner, off Humphrey St. Approx. $350,000. Arland A. Dirlam, Inc., 739 Boylston St., Boston, archt. CD 5/9.

BUILDINGS—SLC

Mass., Medford—WAREHOUSE—Sugarman Bros., Inc., 535 Windsor St., Cambridge, soon lets contract 65,000 sq. ft. steel warehouse, incl. heating plumbing and electrical appurtenances. Approx. $500,000. Irving S. Paley, 219 Central St., Lowell, engr.

HEAVY CONSTRUCTION—LB & CA

▲ **John Bowen Co., Inc.,** 173 Boston St., Dorchester, Mass., LB $2,693,793, est. $2,000,000, South Bay Incinerator Building in Roxbury, BOSTON, MASS. City, P. Wks. Dpt., City Hall Annex, Boston, Mass. Bids Oct. 31. CD 10/15.

Vanguard Constr. Corp., 369 Lexington Ave., New York, N. Y., LB $504,304 (12 bidders) Contr. No. 1, sewage treatment facilities and misc. appurtenances, WILLIMANTIC, CONN. City of Willimantic, City Hall, Willimantic, Conn. Bids Oct. 28. CD 9/30.

BUILDINGS—LB & CA

▲ **Swanburg Constr. Corp.,** Lumber Lane, Manchester, N. H., CA $1,062,000, HIGH SCHOOL south of Monkton Rd., VERGENNES, VT. Union High School Dist. No. 5, Lloyd Moulton, supt., Vergennes, Vt. Bids Oct. 2. CD 10/7, under LB.

▲ **John A. Volpe Constr. Co.,** 54 Eastern Ave., Malden, Mass., LB $1,346,648 HOSPITAL addn., alterations, Prospect St., FALL RIVER, MASS. Union Hospital, 538 Prospect St., Fall River, Mass. Bids Oct. 30. CD 10/22.

Robert Stone Co., 44 West Foster St., Melrose, Mass., Approx. $350,000, Separate Contracts, RESIDENTIAL DEVELOPMENT "Elmwood Village", 16 houses, Rte. 62, NORTH READING, MASS.

Owner, c/o Saunders & Shannon, 1102 North Main St., Randolph, Mass. Separate Contracts, Approx. $350,000, RESIDENTIAL DEVELOPMENT, Tilden Rd., SCITUATE, MASS.

Cannata Brothers, 1779 Central St., Stoughton, Mass., Separate Contracts, Approx. $350,000, RESIDENTIAL DEVELOPMENT, Pleasant St., off Rte. 27, SHARON, MASS.

Jefferson Constr. Co., 75 First St., Cambridge, Mass., CA $526,500, est. $525,000, ANIMAL BLDG. Addn., Maple Ave., SHREWSBURY, MASS. Worcester Foundation for Experimental Biology, c/o Ralph Gow, 222 Maple Ave., Shrewsbury, Mass. Alonzo J. Harriman, Inc., 292 Court St., Auburn, Me., archt.

John F. Griffin Co., 34 Regent St., Cambridge, Mass., CA Approx. $400,000, CHURCH and AUDITORIUM, West and Summer Sts., STOUGHTON, MASS. Our Lady of the Rosary R. C. Parish, c/o Chancery Office, 1 Lake St., Brighton, Mass. Bids Oct. 23. CD 10/15.

Charles Logue Bldg. Co., 71 Needham St., Newton, Mass., LB $513,630, ELEMENTARY SCHOOL, Green St., North Weymouth, WEYMOUTH, MASS. Town of Weymouth, Elmer S. Mapes, supt. Schools, 111 Middle St., East Weymouth, Mass. Bids Oct. 26. CD 10/10.

▲ **Harley Robinson,** 2 Tyler St., West Warwick, R. I. Owner Builds. $4,000,000-$5,000,000, HOUSING DEVELOPMENT, SHOPPING CENTER and RECREATION CENTER, Lake Tiogue Section Rte. 3, 300-350 houses, COVENTRY, R. I.

▲ **E. & F. Constr. Co.,** 94 Wells St., Bridgeport, Conn., LB $1,034,400 (6 bidders) GRADUATE DORMITORY (Mens and Womens) Temple St., NEW HAVEN, CONN. Yale University, Office of Treas., 119 College St., New Haven, Conn. Bids Oct. 29. CD 10/17.

Gramercy Constr. Co., Shannon Bldg., Norwich, Conn., LB $951,882, (14 bidders) Proj. BI-D-203, ENGINEERING BLDG., University of Conn., STORRS, CONN. State P. Wks. Comr., 165 Capitol Ave., Hartford, Conn. Bids Oct. 30. CD 10/4.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

▲ **New York**—BA 12/5—Power Auth. of State of New York, The Coliseum Tower, 10 Columbus Circle, New York, Zone 19, main power plant of Niagara Power Project in Lewiston near Niagara Falls, Contr. N-3. Plans deposit $50. Extended date. Uhl, Hall & Rich, 230 Congress St., Boston 10, Mass., engrs. CD 10/11.

HEAVY CONSTRUCTION—LB & CA

▲ **NEW YORK**—Dpt. P. Wks., Gov. Alfred E. Smith State Office Bldg., Albany. Bids opened 10/31.

N. Y.—Fitzgerald Bros. Construction Co., Inc., 92 Fourth St., Troy, N. Y. LB $568,104, est. $672,000. (3 bidders) widn., resurf. 1.75 mi. Rte. 9 in 2 sections from southerly intersection of Old Loudon Rd. northward to point about 1,900 ft. south of Latham Circle and from point about 2,300 ft. north of Circle northward to the northern intersection of Old Loudon Rd., existing hy. sections now 30 ft. will be widened to 48 ft. (4-lanes) and b. conc. resurf., Albany Co.;

N. Y.—Torrington Construction Co., Inc., PO Box 336, 999 South Main St., Torrington, Conn. LB $661,790, est. $804,000 (1 bidder) relocation of portions of Routes 9, 9N and 22 in Keeseville, incl. 3-span 225 ft. bridge over Ausable River, Clinton and Essex Counties;

N. Y.—Vernon Christian Jr., Box 413, Utica, N. Y. LB $326,637, est. $410,000 (9 bidders) reconstr. 5.94 mi. section of Picketts Corners-Chazy Lake town road, existing 8 to 10-ft. wide gravel road widened to 18 ft., straightened and provided with new surf. tr. grav. pavement, Clinton Co.;

N. Y.—Walter P. Blimm Co., Inc., 270 State Rd., Lockport, N. Y. LB $2,404,928, est. $2,515,000 (3 bidders) constr. 3.81 mi. section on West Ave. portion of Lockport's East-West Arterial Rte., incl. relocation of ½ mi. portion of Upper Mountain Rd. and new bridge to carry the N.Y.C.R.R. over the new Upper Mountain Rd. alignment, Niagara Co.;

N. Y.—Collins Brothers Inc., 12 Tallmadge Pl., Mechanicville, N. Y. LB $1,684,146, est. $1,847,000 (6 bidders) 4 lane divided conc. 2.14 mi. Crosstown Connection Arterial Rte., access roads 0.88 mi. in Schenectady, all street intersections except State St. will be graded, State St. traffic interchange facilities, with State St. passing over connection at Rte. 7, Cross town connection will be graded only, State St. bridge over new connection will have curb-to-curb width of 54 in. flanked by 10 ft. wide sidewalks on each side, Schenectady Co.;

N. Y.—Mount Vernon Construction Corp., 439 North Terrace Ave., Mt. Vernon, N. Y. LB $14,285,489, est. $15,500,000 (7 bidders) 5.95 mi. Rye Section of Cross-Westchester Expressway between City of Rye and Village of Port Chester; incl. 8.95 mi. local service roads and access ramps incl. relocation of 0.84 mi. Hutchinson River Parkway traffic interchange facilities, between Expressway and New England Thruway, structures to carry 6-lane divided Expressway and Westchester Ave. eastbound and westbound over relocated Hutchinson River Parkway, Kenilworth Rd. and Purchase St. over the Expressway, the Expressway over relocated Westchester Ave. eastbound and Bowman Ave. over the Expressway, the Expressway over the Blind Brook, Bowman Ave. over Blind Brook and relocated Ridge, and High Sts. and Boston Post Rd. over the Expressway, Westchester Co. CD 10/3.

▲ **Allis-Chalmers Mfg. Co.,** 50 Church St., New York, N. Y. LB $7,135,000. (3 bidders) Sch. 1, twelve furnishing, del. 37,500/HP 25,000 kva motor-generators for Tuscarora Power Plant, in Lewiston, Niagara Co., Contr. NP-2, NEW YORK. Power Auth. of State of New York the Coliseum Tower, 10 Columbus Circle, New York 19, N. Y. Bids Oct. 30. CD 10/25.
Brown & Boveri Corp., 19 Rector St., New York, N. Y. LB $2,810,400 (4 bidders) Sch. 2 six motor-generators; LB $2,655,400 Sch. 3 six motor-generators, Contr. NP-2, (New York).

▲ **Ferranti Electric, Inc.,** Hollinwood, England. LB $3,925,250 (8 bidders) Sch. 1, furnishing, del. thirteen 180,000 kva three-phase power transformers for Lewiston Power Plant, Niagara Power Proj.; LB $1,862,180 (8 bidders) Sch. 2, seven transformers all for Contr. NP-5, NEW YORK. Power Auth. of the State of New York, The Coliseum Tower, 10 Columbus Circle, New York 19, N. Y. Bids Oct. 30. CD 10/25.
English Electric Export & Trading Co., 23 Beaver St., New York, N. Y. LB $1,995,190 (8 bidders) 6 transformers, Contr. NP-5 (New York).

▲ **Fehlhaber Corp.,** 217 E. 49th St., New York, N. Y., LB $6,828,705, Contract TN-4A, Bronx anchorage foundation and superstructure for Throgs Neck Bridge, NEW YORK. Triborough Bridge and Tunnel Auth., Randall's Island, New York 35, N. Y. Bids Oct. 20. CD 9/23;
J. Rich Steers, Inc. & Frederick Snare Corp., 17 Battery Place, New York, N. Y., LB $10,222,350, Contr. TN-4B, Queens anchorage foundation and superstructure for Throgs Neck Bridge (New York).

J. Rich Steers Co., 17 Battery Pl., New York 4, N. Y. LB $707,985. (3 bidders) Contr. TN-2 B, modification of dock at Fort Schuyler, for Throgs Neck Bridge, Bronx Boro, NEW YORK. Triborough Bridge & Tunnel Auth., Administration Bldg., Randall's Island, New York 35, N. Y. Bids Oct. 24. CD 10/9.

Long Island State Park Comn., Babylon, N. Y., rejected bids Oct. 22, boardwalk reconstr., East Bathhouse shelters, Contr. No. 7, at Jones Beach State Park, WANTAGH, N. Y. CD 10/10.

PENNSYLVANIA—State Dpt. Hys., 506 North Office Bldg., Harrisburg,

H. R. Miller Co., Inc., Box 1235, Lancaster, Pa. CA $647,071, 32,085 ft. crushed aggreg. base, bit. surf. 20 ft. wide, 4 arches, T.R. 507, Lehigh and Dreher Twps., Wayne Co. Bids Oct. 11. CD 10/16, under LB.

▲ **Christopher Constr. Co.,** 546 N. 4th St., Columbus, O. CA $595,322, Contract No. 1, sewage treatment plant; sewage facilities, incl. sewage treatment plant with appurtenant constr., sewage diversion of weir manholes, force main and gravity sewer connections Pumping Stations No. 1 and No. 2 and appurtenant constr., WARREN, PA. At Office, Borough Manager, Warren Borough Sanitary Auth., Municipal Bldg., Warren, Pa. Grand total $1,058,672. Bids Oct. 2. CD 8/30.
Millano Constr. Co., 1958 W. 26th St., Erie, Pa. CA $144,615, Contract No. 4, heating work; CA $146,285, Contract No. 8, Conewango Creek Crossing and Allegheny River Force main crossings (Warren, Pa.);
Keystone Constr. Co., 90 Race St., Meadville, Pa. CA $89,856, Contract No. 6, Sewage Pumping Station No. 1; CA $82,594, Contract No. 7, Sewage Pumping Station No. 2 (Warren, Pa.).

▲† **Poole & Kent,** 332 E. 25th St., Baltimore 18, Md. LB $1,142,000. (5 bidders), air-conditioning U. S. Post Office and Court House, BALTIMORE, MD. General Services Admin., Pub. Services Constr. & Repair Div., Region 3, Rm. 7100, 7 and 5 Sts. S.W., Wash. 25, D. C.

BUILDINGS—LB & CA

▲ **Stratford Park Homes,** c/o Alurn Cassens, Jr., archt., 145 S. Franklin Ave., Valley Stream, L. I. Owner Builds. $1,000,000, 49 HOMES, Bellmore Rd., BELLMORE, N. Y.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England — **Middle West**
Middle Atlantic — **West of Mississippi**
South — **Far West**

PROPOSED WORK
Water Supply — **Public Buildings**
Sewers, Waste Disposal — **Mass Housing**
Bridges — **Commercial Buildings**
Streets & Roads — **Industrial Buildings**
Earthwork, Waterways — **Unclassified**

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
SOON LETS CONTRACT: SLC
LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.
CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.
CD dates shown are of Construction Daily Issue in which last previous report was published.
OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

† Federal Government
▲ Project of $1,000,000 or over.
ENR Engineering News-Record
CD Construction Daily

For additional reports see Construction Daily.

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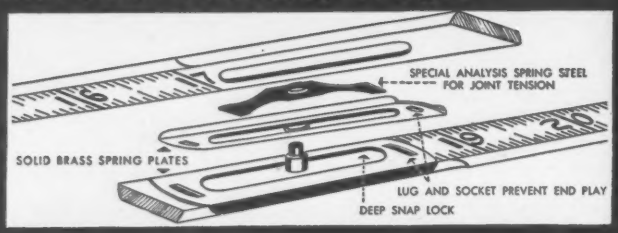
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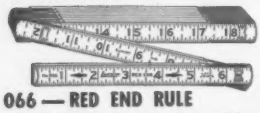

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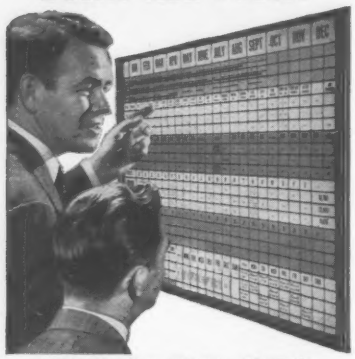

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▲ **Thomas J. Hughes Constr. Co., Inc.,** Grand Central Terminal Bldg., New York 19, N. Y. CA **$1,043,000,** CHURCH and SCHOOL addn. for St. Clare Parish, GREAT KILLS, N. Y. Archdiocesan Bldg. Comn., 451 Madison Ave., New York 22, N. Y. Bids Sept. 20. CD 6/3.

S.R.B. Corp., c/o Lane Realty Co., 107-40 Queens Blvd., Forest Hills, N. Y. Owner Builds. **$374,000,** 17 HOMES, Lagoon Blvd. off Fox Blvd., MASSAPEQUA, N. Y.

Manetto Hill Estates, c/o Stanley H. Klein, archt., 89-31 161 St., Jamaica, N. Y., Owner Builds. **$360,000,** 18 HOMES, Manetto Hill Rd., PLAINVIEW, N. Y.

▲ **John Elgar,** P.O. Box 37, South Amboy, N. J. Own Forces. **$1,000,000,** 59 HOUSES, Kenwood Dr., to be known as Brigadoon Village, Middletown Twp., EDISON, N. J. Peter M. Grygotis, 306 Aldene Rd., Roselle, N. J., archt.

▲ **Thomas Wilton Corp.,** Dover-Chester Rd., Ironia, N. J. Own Forces. **$2,000,000,** 90 HOUSES, Atno Rd. at Rte. 513, to be known as Wilton Estates, IRONIA, N. J. Henry Vreeland, 4 Court St., Morristown, N. J., archt.

▲ **Beacon Constr. Co.,** Hudson St., Union, N. J., Own Forces, **$1,350,000,** 40 HOUSES, West Drive Park and Hillside Ave., LIVINGSTON, N. J. Louis N. Steuber, 2092 Morris Ave., Union, N. J., archt.

▲ **Lepar Constr. Co.,** 105 N. England Ave., Summit, N. J. Own Forces. **$1,500,000-$2,000,000,** 8 story, 100 family APARTMENT, Vose Ave. and Scotland Rd., ORANGE, N. J. Isadore Naftali, 312 High St., Newark, N. J., archt.

▲ **Gilbert Cutler,** c/o J. Di Leo Agency, Plainfield Ave., Stilton, N. J., Own Forces. **$1,320,000,** 90 HOUSES, Franklin Ave. and River Rd., PISCATAWAY, N. J. Joachim W. Hilton, 28 Oak Crest Rd., West Orange, N. J., archt.

▲† **McCloskey Co.,** 1620 W. Thompson St., Phila., Pa., CA **$20,933,000,** SOCIAL SECURITY HEADQUARTERS, BALTIMORE, MD. General Services Admin., 19 and F Sts. N.W., Wash. 25, D. C. Bids Oct. 17. CD 10/21, under LB;
Otis Elevator Co., 101 20th St. N.W., Wash., D. C., CA **$732,299,** elevators for Social Security Headquarters (Baltimore, Md.).

Opha Mays, 7403 Aspen Ave., Takoma Park, Md., CA **$899,850** (7 bidders) JUNIOR HIGH SCHOOL, LAUREL, MD. Prince George's Co. Bd. Educ., Marlboro, Md. Bids Oct. 30. CD 10/14.

Bethlehem Steel Co., Bethlehem, Pa. Owner Builds. $579,208. 2 WAREHOUSES, MACHINE SHOP, 2 brick STORAGE BLDGS., SPARROWS POINT, MD.

▲ **Standard Constr. Co.,** 1010 Vermont Ave. N.W., Wash., D. C. CA **$4,556,081.** 422 DWELLING UNITS, Housing Proj. DC 119, Kenilworth Courts, WASH., D. C. National Capital Housing Auth., 1729 New York Ave. N.W., Wash., D. C. Bids Oct. 17. CD 10/21, under LB.

▲ **Skinker & Garrett,** 2607 Connecticut Ave. N.W., Wash., D. C. CA **$1,261,000.** (Base Bid), constr. MEMORIAL BLDG., Massachusetts Ave. and North Capitol St., WASH., D. C. National Guard Assoc., 100 Indiana Ave., N.W., Wash., D. C. Bids Sept. 26. CD 9/30, under LB.

SOUTH

HEAVY CONSTRUCTION—BA

S. C., Charleston—ELECTRICAL DISTRIBUTION—BA 12/3—S. C. State Ports Auth., 1 Vendue Range, Charleston, State Proj. No. 23-14, electrical distr. sys. for North Charleston Ship Terminal. Plans deposit $50. Lockwood Greene Engineers, Inc., Montgomery Bldg., Spartansburg, S. C., and Palmer & Baker, Inc., 957 Springhill Ave., Mobile, Ala. engrs. CD 5/3.

BUILDINGS—BA

Ala., Lineville—HOUSING UNITS—BA 11/19—Lineville Housing Auth., Town Hall, 24 low rent housing units. Plans deposit $50. Linton H. Young, 1128 Candler Bldg., Atlanta, Ga., archt.

▲ **Ky., Louisville**—SCHOOL—BA 11/21—Jefferson Co. Bd. Educ., 618 W. Jefferson, Louisville, brick, reinf. con. Fairdale Junior High School, $1,425,000. Plans deposit $25. E. R. Ronald & Assoc., 554 S 3rd St., Zone 2, consult. engrs. Hartstern Louis & Henry, McDowell Bldg., Zone 2, archts. CD 10/23.

HEAVY CONSTRUCTION—LB & CA

▲ **WEST VIRGINIA**—State Road Comn., Charleston, Zone 5, Bids opened 10/29,

W. Va.—Bennie Snyder, White Sulphur Springs, W. Va., LB **$118,805,** traffic bound base and b. conc. bottom and wearing courses 1.153 mi. Welch-Maitland Rd., U. S. 52, Proj. F. 309 (10) McDowell Co.; LB **$587,658,** c. conc. pavement, traffic bound base cr. and bridges 1.807 mi. Fetterman-Pruntytown Rd., U. S. 50, Proj. F. 282 (10), Taylor Co.;

W. Va.—Boso & Ritchie, Inc., Ravenswood, W. Va., LB **$881,746,** grading, draining 0.847 mi. Burning Springs-Witchers Creek Rd., U. S. 60, Contr. 7, Proj. F. 221 (18), Kanawha Co.;

W. Va.—Howard Price & Co., Huntington, W. Va. and **Andersons' Inc.,** 1500 Pennsylvania Ave., Charleston, W. Va., LB **$176,625,** traffic bound base cr. and b. conc. bottom and wearing courses 0.839 mi. Fourth Ave., Williamson, Vinson St. Bridge to Peters St., U. S. 52, Proj. 218-A, Mingo Co. CD 10/15.

WEST VIRGINIA—State Road Comn., Charleston, Bids opened 10/29,

W. Va.—Maxon Constr. Co., Inc., 2600 Far Hills, Dayton, O., LB **$487,510,** Martinsville Bridge No.

(Continued on page 121)

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Above: South Broadway Interceptor
Below: Tolleston Area: Chase Interceptor; 25th Street Interceptor
Engineer: Hurst-Roche, Inc., Hillsboro, Ill.
Contr.: Witter-Gaddis Constr. Co., Schererville, Ind.

Rhode Island Interceptor (not shown)
Engineer: Hurst-Roche, Inc.
Contractor: Marsch Construction Co., Chicago

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To meet the needs of its expanding population, Gary, Indiana has invested $6,000,000 in new concrete interceptor and relief sewers.

The first project, a $2 million job, consisted of (a) an interceptor on Rhode Island Avenue using reinforced concrete sewer pipe ranging from 96″ to 132″ in size and (b) an interceptor on South Broadway requiring over a mile of concrete pipe ranging from 24″ to 84″.

The second project, the Tolleston Area: Chase Interceptor; 25th Street Interceptor, was a $4 million job. The Chase Interceptor required about 2 miles of reinforced concrete sewer pipe from 60″ to 132″ in diameter. The 25th Street Interceptor required one and one-half miles of concrete pipe ranging from 24″ to 84″ in size.

The 132″ pipe was the largest ever installed in northwest Indiana. Both projects were financed by bond issues.

Countless cities have learned that concrete pipe has rugged durability and great structural strength. It offers maximum hydraulic capacity, minimum infiltration and leakage and exceptional resistance to abrasion.

Concrete pipe sewers are moderate in first cost, require very little maintenance, and give a lifetime of faithful service. The result: *low annual cost.*

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A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work

(Continued from page 118)

2042 over Ohio River, substructure Piers 3, 4, 5 and 6, W. Va. 7, Contr. No. 1, Proj. S. 47(2);

W. Va.—**Thomas N. Nunnally,** Erwin Lane, Fairmont, W. Va., LB **$147,619,** cont. concrete deck girder Pentress Bridge No. 2031 over Dunkard Creek, Contr. No. 2, Proj. S. 165(7). CD 10/15.

▲ **NORTH CAROLINA**—State Hy. Comn., Raleigh, Bids opened 10/29,

N. C.—**Suber & Co., Inc.,** Whitmire, S. C., LB **$1,327,-882** est. exceeds $400,000-$500,000, grading 9.04 mi. relocation US 70 from point south of Efland, East toward Durham Co. line, Proj. No. 8.14570 I-725(1), Orange Co.;

N. C.—**Asheville Constr. Co., Inc.,** Box 5118, Biltmore Sta., Asheville, N. C. LB **$196,490,** est. $175,000-$200,000, grading, CABC, bit. surf. and structures 3.21 mi. NC 18 from Laurel Springs southeast to point approx. 0.6 mi. north of Alleghany Co. line at Mulberry Gap, Proj. No. 8.17082 S-896(1), Alleghany Co.;

N. C.—**Mt. Airy Grading Co.,** Mt. Airy, N. C., LB **$917,876,** est. $400,000-$500,000, grading 10.27 mi. relocation US 158 from point southwest N.C. 801 in Davie Co., northeast to West City limits of Winston-Salem, Proj. No. 8.17414 I-35(11), Davie and Forsyth Counties. CD 10/21.

▲ **NORTH CAROLINA**—State Hy. Comn., Raleigh, Bids opened 10/29,

N. C.—**Wannamaker & Wells, Inc.,** Orangeburg, S. C., LB **$944,916** est. $400,000-$500,000, structures US 70 relocation from point south of Efland, east toward Durham Co. Line, 8.14570, I-725(1), Orange Co.;

N. C.—**McMeekin Constr. Co.,** Cheraw, S. C., LB **$323,-055,** est. $300,000-$400,000, bridge, approaches over Yadkin River on relocation US 421 west of Winston-Salem, 8.17391, F-172(3), Yadkin and Forsyth Counties;

N. C.—**Bowers Constr. Co.,** Box 1706, Raleigh, N. C., LB **$1,909,985,** est. $400,000-$500,000, structures on relocation US 158 from point southwest of NC 801 in Davie Co., northeast to West City limits of Winston-Salem, 8.17414, I-35(11), Davie and Forsyth Counties. CD 10/21, under Streets and Roads;

N. C.—**Dickerson, Inc.,** Monroe, N. C., LB **$119,750,** est. $100,000-$125,000, bridge over Mill Creek near Walnut Cove and over Dan River near Danbury on County Roads 8.28356, S0913(1), S-914(1), Stokes Co. CD 10/21.

BUILDINGS—LB & CA

Bradford Builders, Inc., 132 Aragon Ave., Coral Gables, Fla., LB **$942,275,** Base Bid (10 bidders), Stranahan HIGH SCHOOL, (1957 addns.) 18000 SW 5th Place, FORT LAUDERDALE, FLA. Broward Co. Bd. P. Instructors, 1320 SW 4th St., Supt. Office, Fort Lauderdale, Fla. Bids Oct. 24. CD 10/3.

Dale Contg. Co., 1140 NE Flager Dr., Fort Lauderdale, Fla., LB **$450,586,** APARTMENT, (13 units) 505 Breakers Ave., FORT LAUDERDALE, FLA. Leneva Corp. "Imperial" 303 E. Las Olas Blvd., Fort Lauderdale, Fla. Bids Oct. 25, CD 10/16.

▲ **A. C. Sanford, Inc.,** Box 1229, Albany, Ga. CA **$3,770,800,** INDUSTRIAL SCHOOL FOR BOYS, Proj. 341, OKEECHOBEE CITY, FLA. Bd. Comrs., State Institutions, Terry C. Lee, secy., Tallahassee, Fla. Bids Oct. 23, awarded Oct. 29. CD 10/29, under LB.

▲ **J. S. Cole Constr.,** Box 1881, Charlotte, N. C., LB **$1,228,718,** Sarasota SENIOR HIGH SCHOOL, Swift and Ashton Rd., SARASOTA, FLA. Sarasota Co. Bd. P. Instruction, Court House, Supt. Office, Sarasota, Fla. Paul Dudolph, 1356 Main St., Sarasota, Fla., archt. Bids Oct. 17. CD 10/11.

Bartley, Inc., Box 344, Lake Charles, La., CA **$581,615,** high school at DeQuincy, LAKE CHARLES, LA. Calcasieu Parish School Bd., H. A. Norton, secy., Lake Charles, La. Bids Oct. 15. CD 10/8.

MIDDLE WEST

BUILDINGS—BA

Mich., Harland—SCHOOL—BA 11/21—Bd. Educ., Hartland School Dist., Hartland, Senior High School, Maple Rd. $850,000. Plans deposit $50. Charles W. Lane & Assoc., 3366 Washtenaw, Ann Arbor, Mich., archts. CD 9/17.

HEAVY CONSTRUCTION—LB & CA

DeHamel Constr. Co., Citizens Bldg., Cleveland 14, O., LB **$542,496,** (9 bidders) sewage disposal plant, BEDFORD HEIGHTS, O. Village Bedford Heights, Aurora Rd., Bedford Heights, O. Willard Schade & Assoc., Chester-12 Bldg., Cleveland 14, O., engrs. Bids Oct. 25. CD 10/8.

▲ **INDIANA**—Indiana State Hy. Comn., State House Annex, Indianapolis,

Smith & Johnson, Inc., 1799 Kentucky Ave., Indianapolis, Ind., and **Hunt Paving Co.** (connected with Huler, Hunt & Nichols), 2450 S. Tibbs Ave., Indianapolis, Ind., CA **$1,453,741,** pave 4.7 mi. Madison Ave. Expressway, S. Madison Ave., Marion Co. Awarded Oct. 22. CD 4/17.

▲ **Kenny Constr. Co.,** 3220 Oakton St., Skokie, Ill., LB **$1,536,850,** Contr. No. 6, intercepting sewers, Howard St., NILES, ILL. Metropolitan Sanitary Dist. of Greater Chicago, 100 E. Erie St., Chicago, Ill. Bids Oct. 31. CD 10/21.

BUILDINGS—LB & CA

Eugene S. Babilla, Inc., 578 Broadway, Gary, Ind., LB **$553,385,** Horace Mann ELEMENTARY SCHOOL, sewers, paving, 7 St. between Garfield and Cleveland, GARY, IND. School City of Gary, 524 Garfield St., Gary, Ind. R. S. Kastendieck, 673 Broadwa,, Gary, Ind., archt.

▲ **Arthur G. McKee & Co.,** 2300 Chester St., Cleveland, O., CA Est. **$10,000,000,** design and construct constr. large volume CRUDE OIL DISTILLATION UNIT, 140,000 bbl. daily capacity, WHITING, IND. Standard Oil Co. of Indiana, 119 and Front Sts., Whiting, Ind.

▲ **Tedland Development Co.,** 1152 Camp Jackson Rd., Cahokia, Ill., Owner Builds. **$1,250,000,** constr. 370 RESIDENCES in Cahokia Heights subdivision, incl. sanitary and storm sewers, paved streets, etc. Camp Jackson Rd., mi. south of East St. Louis, CAHOKIA (EAST ST. LOUIS, P. O.) ILL.

V. Sota Constr. Co., Livonia, Mich., CA **$433,220** general contract HIGH SCHOOL Addn., GYMNASIUM and SHOP, FLAT ROCK, MICH. Bd. Educ., Brownstown School Dist. No. 1, Flat Rock, Mich. Dolgner & Rollason, 13827 Fenkell, Detroit, Mich., archts.

▲ **Compass Co.,** 15934 West McNichols Rd., Detroit, Mich., Owner Builds. **$7,900,000,** 500 brick HOMES, "Kensington Hills," Milford and General Motors Rd., MILFORD, MICH.

Hungerford Constr. Co., 1425 Wildwood, Jackson, Mich., LB **$469,200** general contract Tecumseh Acres ELEMENTARY SCHOOL; addn., alterations to HIGH SCHOOL, TECUMSEH, MICH. Bd. Educ., Tecumseh Public Schools, Dr. R. F. Helzerman, Secy., Tecumseh, Mich. Bids Oct. 17. CD 9/30.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

Missouri—RURAL DISTRIBUTION LINES—BA 11/27—Pemiscot-Dunklin Electric Co-operative, Inc., Hayti, Mo., 19.1 mi. tie line, 87.6 mi. line conversion and 5 sub-stations, Proj. Missouri 12W Pemiscot, Pemiscot Co. Plans deposit $10. CD 9/17.

BUILDINGS—BA

▲ **Mo., Hazelwood (St. Louis 15 P.O.)**—WAREHOUSE—BA 11/19—The Kroger Co., G. H. Scott, 35 E. 7 St., Cincinnati, O., and Robert A. Hughes, regional mgr., 1311 S. 39th St., St. Louis, Zone 10, Mo., 1 story, 419x660 ft., brick, steel (erection only) steel joists, masonry blocks, etc. warehouse and office; 60x340 ft. covered drive, railroad deck, etc. garage on 63 acre tract on U. S. 66. Hall, McAllister & Stockwell, engrs., and Howard L. Elliston, archts., both 706 Walnut St., Cincinnati, O. CD 11/19/56.

Minn., Cloquet—HIGH SCHOOL—BA 11/26—Bd. Educ., B. O. Carlson, clk., high school addns., alterations, incl. swimming pool and expansion of gymnasium. $750,000. Toltz Kink, Duvall, Anderson & Assocs., 1509 Pioneer Bldg., St. Paul, archts. CD 7/2.

▲ **Tex., Port Arthur**—SCHOOL—BA 12/12—Port Arthur Ind. School Dist., Port Arthur, 215,000 sq. ft. masonry high school. $3,000,000. Bid date changed. Caudill, Rowlett & Scott, 425 S. Main St., Bryan, and J. Earl Neff, Box 1105, archts. CD 10/25.

BUILDINGS—SLC

Minn., Collegeville—ABBEY, etc.—St. John's University, Collegeville, soon lets contract 164x180 ft. St. John's Abbey church, bsmnt. and upper church, 60x60 ft. chapter house. $500,000. M. Breuer & Assocs., 201 East 57th St., New York, N. Y., archts. Traynor & Hermanson, Ste. Cloud, Minn., owner's coordinating archts.

Tex., Dallas—PARKING GARAGE—Associated Parking facilities of Texas, Commerce and Harwood Sts., soon lets contract, parking garage. $200,000. CD 10/22.

Tex., San Antonio—MOTEL—Caltex Properties Inc., 1122 N. Cherry St., soon lets contract, 76 unit motel, E. Elmira between Atlanta and Erie. $350,000. Beretta, Greenslade & Assocs., Inc., 1927 N. St. Marys, San Antonio, Tex., engrs. CD 8/16, under Gorman R. Silenn & Assocs., c/o Frank M. Valdez, archt., 1716 San Pedro Ave., San Antonio, as owners.

Tex., Tyler—SCHOOL—Immaculate Conception Church of Dallas, Fort Worth Roman Catholic Diocese, c/o Rev. Edw. V. McCullough, pastor, soon lets contract, Junior-Senior High School. $350,000. Walter Cocke, Jr. & Co., 1507 Franklin Ave., Waco, archts. Zumwalt & Vinther, Merc. Sec. Bldg. and Mullen & Powell, Insuromedic Bldg., both of Dallas, engrs. CD 10/14.

HEAVY CONSTRUCTION—LB & CA

▲† **Western Contg. Corp.,** 400 Benson Bldg., Sioux City, Iowa, LB **$8,909,913** (3 bidders) earthwork, Stage IV, Oahe Reservoir Proj., ENG-25-066-58-33, SOUTH DAKOTA. U. S. Eng., 1709 Jackson St., Omaha 2, Neb. Bids Oct. 31. CD 10/23.

Trinity Constr. Co., P. O. Box 3024, Houston, Tex., LB **$492,900** raising Lake Eddleman Dam, GRAHAM, TEX. City, c/o J. B. Tackett, mgr., Graham, Tex. Bids Oct. 25. CD 10/15.

Elmer C. Gardner, Box 19071, Houston, Tex. LB **$856,-632.** Buffalo Bayou Channel rectification, HOUSTON, TEX. City, City Hall, Houston, Tex. Bide Oct. 23. CD 10/17.

† **Brown & Olds Plbg. & Htg. Co.,** P. O. Box 1215, Colorado Springs, Colo., LB $357,528, utilities, Phase 11 (IFB) 05-613-58-14, at Air Force Academy, COLORADO SPRINGS, COLO. Dpt. Air Force, Box 1670, Colorado Springs, Colo. Skidmore, Owings & Merrill, 3333 N. El Paso St., Colorado Springs, Colo., archts.-engrs. Bids Oct. 22. CD 10/14.

BUILDINGS—LB & CA

▲ **Thos. P. Brennan, Jr., Inc., Contractor,** 2231 Butler, Dallas, Tex. CA Approx. **$1,750,000.** SHOPPING CENTER, DALLAS, TEX. Preston Forest Village, c/o

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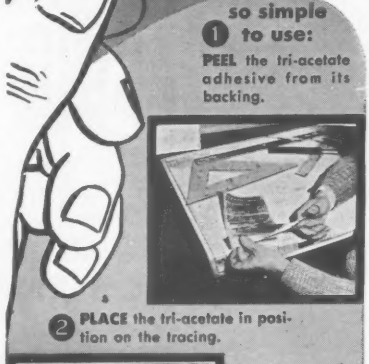
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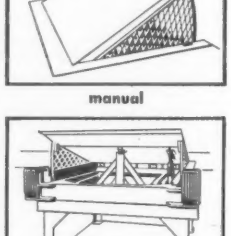

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Thos. P. Brennan, Jr. and Associated Brennans and Mrs. Geo. Graffeo, 2231 Butler St., Houston, Tex. CD 10/29.

Mastin Constr. Co., Clinton, Mo. LB **$592,745,** est. $580,000. GRADE and HIGH SCHOOL, incl. gymnasium with stage, locker rooms, classrooms, home econ. dpt., general science dpt., kitchen, cafe, shop, music room, library, GRANT CITY, MO. School Dist. R-1, Grant City, Mo. Bids Oct. 28. CD 10/21.

▲ **Burton & Lee Realty Co.,** 5865 Hampton Ave., St. Louis 9, Mo., Separate Contracts. **$1,000,000.** development Manchester Forest subdivision, incl. 450 RESIDENCES, storm and sanitary sewers, streets, etc., Sulphur Springs Rd. south of Manchester Rd., WINCHESTER, MO.

▲ **Harmon Constr. Co.,** 28 S. Indiana St., Oklahoma City, Okla., LB **$1,878,800** Base Bid, constr. combination DORMITORY and APARTMENT BLDG. and STUDENT UNION BLDG. for single and married students at Medical Center, LITTLE ROCK, ARK. University of Arkansas Medical Center, Bd. Trustees, Little Rock, Ark. Bids Oct. 24. CD 9/23.

▲ **Peter Kiewit Sons Co.,** Omaha National Bank Bldg., Omaha, Neb. LB **$1,877,547.** (6 bidders), general constr. Southwest JUNIOR HIGH SCHOOL, 42nd and Bancroft Sts., OMAHA, NEB. Bd. Educ., 3902 Davenport St., Omaha, Neb. Bids Oct. 29. CD 10/2; B. Grunwald, 1110 Farnam St., Omaha, Neb. LB **$375,088.** mechanical work (Omaha, Neb.)

▲ **T. S. Bateson Constr. Co.,** Box 35351, Airlawn Station, Dallas, Tex. CA **$4,500,000.** 8 story HOSPITAL addn., DALLAS, TEX. Methodist Hospital of Dallas, 301 W. Colorado St., Dallas, Tex. CD 10/23, under LB.

Seymour Lumber & Constr. Co., Box 571 Seymour, Tex. CA **$683,293.** SCHOOL, HENRIETTA, TEX. Henrietta Ind. School Dist., Henrietta, Tex. Bids Oct. 10. CD 10/23, Under LB.

▲ **Fisher Constr. Co.,** 4711 Greeley St., Houston, Tex. CA **$1,152,870.** MEMORIAL CENTER and CHAPEL, HOUSTON, TEX. (Wm. M.) Rice Institute, 6100 Main St., Houston, Tex. Bids Oct. 22. CD 10/30, under LB.

W. R. Grimshaw Co., Box 1415, Odessa, Tex. LB **$437,700.** 5 story, 2,000 seating THEATRE, SHOPS, ODESSA, TEX. Scott Enterprises, Odessa, Tex. CD 10/10.

Jenkins & Browning, 708 W. Summit St., San Antonio, Tex., Purchase and Hire. **$345,500.** 8 all masonry DWELLINGS in Castle Hills and Hollywood Estates, SAN ANTONIO, TEX. CD 10/17.

Tom & Charles Garrett, 4600 Broadway, San Antonio, Tex., Purchase and Hire. **$370,000.** 20 DWELLINGS in Loma Park, Oak Hills, Terrell Hills, Olmos Park, SAN ANTONIO, TEX. CD 10/17.

Homecraft Builders, c/o Guy Aldridge & Wesley Cooper, 2116 N.W. Military Dr., San Antonio, Tex., Purchase and Hire. **$360,000.** 9 DWELLINGS in Castle Hills, SAN ANTONIO, TEX. CD 10/17.

Central Lumber Co., c/o Bob Ross, 1360 W. Popular St., San Antonio, Tex., Purchase and Hire. **$355,500.** 17 DWELLINGS in Castle Hills and Park Estates, SAN ANTONIO, TEX. CD 10/17.

A. A. & E. B. Jones, 1050 S. Jason, Denver, Colo. LB **$425,600.** general contract, 40,200 sq. ft., 1 story Pitts GRADE SCHOOL, E. Hampden and South Glencoe St., DENVER, COLO. School Dist. No. 1, 414 14th St., Denver, Colo. C. Gordon Lee, 1031 15th St., Denver, Colo., archt.-engr. Bids Oct. 23. CD 10/3.

Brown-Schrepferman, 240 Washington, Denver, Colo. LB **$938,000.** general contract 6 story, 2 bsmnt., 108,000 sq. ft. OFFICE BLDG., East 8th Ave. and Grant St., DENVER, COLO. 777 Corporation, c/o Hamilton Management Corp., Speer Blvd., Denver, Colo. Ketchum & Konkle, 1090 Fox St., Denver, Colo., struct.-engrs. Swanson-Rink & Konkle, 1090 Fox St., Denver, Colo., elect. engrs. Bids Oct. 22. CD 10/3.

Linn Gardens, Inc. (Sch. 1), 4900 Country Rd. No. 16, Minneapolis, Minn. LB **$471,979.** 60 Capehart Permanent Family HOUSING, twenty 3 bedroom family housing units; outside utility work; incl. drainage, grading, drives, walks and utility lines, Pueblo Ordnance Depot, PUEBLO, COLO. Omaha Dist. Corps of Engrs., 1709 Jackson St., Omaha, Neb. Miles Lantz, 933 Sherman, Denver, Colo., engr.-archt. Bids Oct. 22. CD 9/11.

FAR WEST

BUILDINGS—BA

▲ **Calif., Sacramento** — SCHOOL — BA 11/25 — Sacramento City Unified School Dist., 1619 N St., Sutter Junior High School, Alhambra Blvd. and J St. $1,800,000. Gordon Stafford, 1024½ J St., archt. CD 12/18/55.

▲ **Calif., Richmond**—SCHOOL—BA 11/27—Richmond City Elementary & Richmond Union High School Dist., 1108 Bissell Ave., Loring Junior-Senior High School. $1,400,000. John Carl Warnecke, 507 Howard St., San Francisco, archt. CD 3/28.

▲ **Calif., Fresno** — SCHOOL — BA 12/5 (tentative) — Fresno City Unif. School Dist., 2348 Mariposa St., Sierra Junior High School, Cedar and Garland Aves. $1,325,000. Wm. Hastrup, Anglo Bank Bldg., archt. CD 11/26.

HEAVY CONSTRUCTION—LB & CA

▲ **IDAHO**—State Hy. Dpt., Boise,
Carl E. Nelson Constr. Co., Logan, Utah, CA **$1,081,825,** constr. roadway, drainage structures, plantmix bit. surf. 7.431 mi. U. S. 91 and roadway and bit. treatment 0.374 mi. Roberts South. Bids Oct. 22, Awarded Oct. 24. CD 10/15.

(Continued on page 126)

From MINNESOTA to the "BIG MO"...

Manitowoc dragline digs 400,000 yards per month. Easily dismantled for major moves.

Using a Manitowoc Model 4500 dragline equipped with a 7-yd. bucket and a 100′ boom, the Luhr Construction Company of Columbia, Ill., averaged 400,000 yards of black dirt per month on a river cleanout and widening project near Beltrami, Minn. Right after this job the big Manitowoc was dismantled in only four days, shipped to Sibley, Mo., and then reassembled in less than three days. At Sibley the 4500 drag worked on a 180′ — 220′ wide, 23′ deep channel diverting a section of the Missouri River.

The big capacity Manitowoc 4500 is easy to ship and easy to assemble, making long distance moves like this both practical and profitable. By using both the mast and boom during tear-down and reassembly, the 4500 is practically a self-dismantling unit.

Despite its size, this Manitowoc is fast. Simple design and good balance contribute to fast cycles and heaped buckets. The Luhr Construction Company's machine averages two passes every minute — faster than a smaller 3-yd. rig working with the Model 4500.

There's no complicated electric motors — no restrictive trailing cable to hinder mobility. Unit drive, composed of a single diesel power package, gives you unmatched on-the-job mobility seldom found in a machine of this size. Mobility that lets you use the 4500's capacity to profitable advantage on any job.

Here's a real powerhouse with the mobility of units having much smaller capacities. Find out how the Manitowoc 4500 will fit *your* jobs. Your helpful Manitowoc distributor has all the details.

Manitowoc Engineering Corp., Manitowoc, Wis.

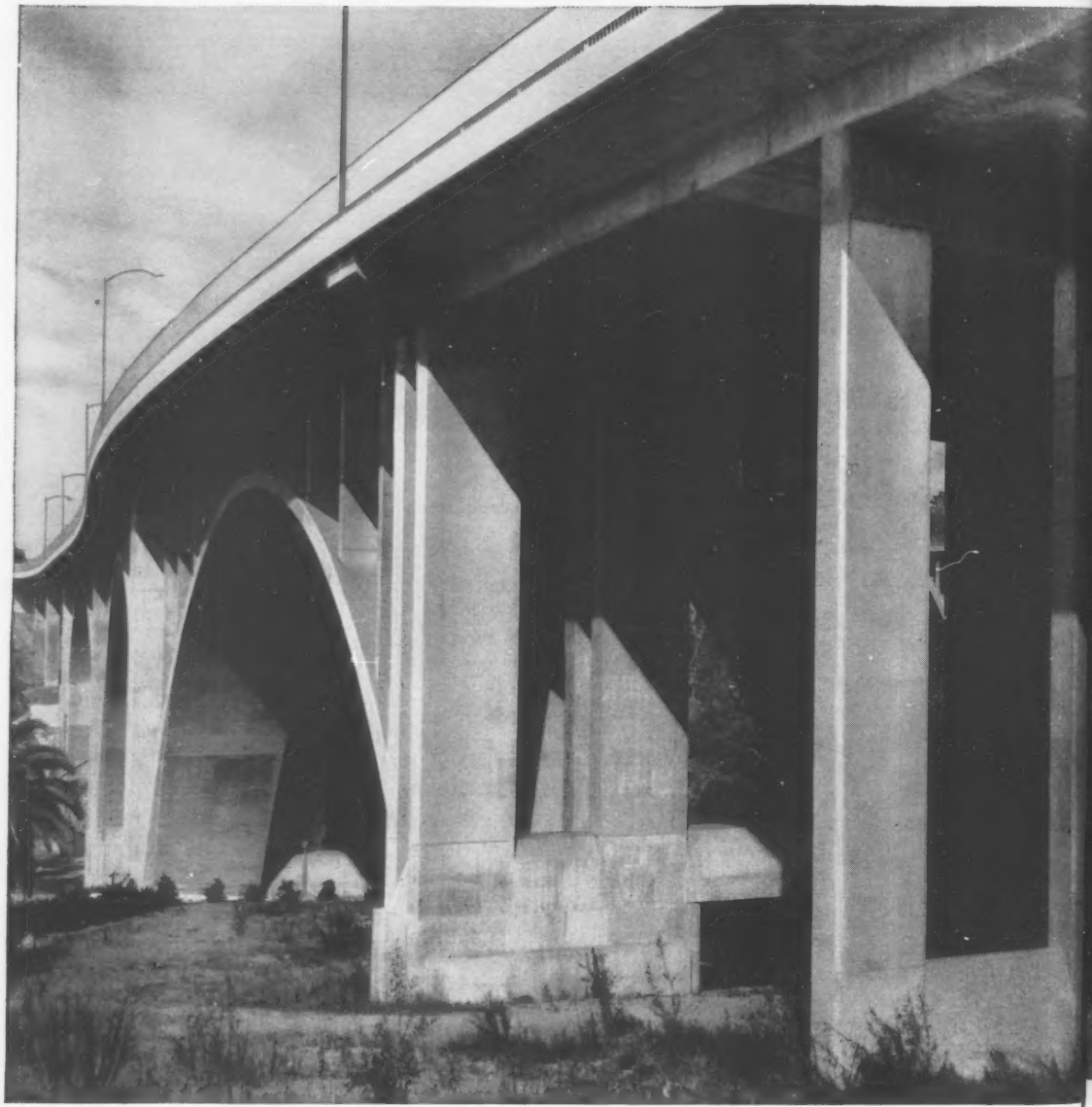
SHOVELS 1-5½ YD.

Manitowoc

CRANES 20-100 TON

Pasadena freeway bridge demonstrates **Three**

# of fir plywood



Fir plywood forms cut costs and solve complex design problems on this Pasadena freeway bridge

key advantages concrete forms

1. design adaptability

On this 3.3 million dollar Colorado Street freeway bridge, Pasadena, California, fir plywood helped solve a complex form problem posed by the six giant arch ribs supporting the roadway. Forms were 5/8" fir plywood, specified because of its adaptability to built-up slip forms.

2. time and labor savings

Fir plywood also speeded construction time for huge built-up form sections used for scores of spandrel columns and main pier columns. Sections ranged from 5 to 80 feet in height. Workability and multiple re-use make fir plywood ideal for such applications.

3. smooth concrete surfaces

Fir plywood was specified by the California State Highway Department to assure smooth surfaces on all exposed concrete. The contractor, Guy F. Atkinson Co., developed the form system which was moved laterally from one arch to the other, an engineering feat considered to be unique in the construction field.

Close-up of 5/8" fir plywood arch rib form section. After pouring one set of arches, entire falsework was lowered several inches and skidded into place for second set.

Workmen stripping one of giant built-up 80-foot column forms. Forms were of 5/8" fir plywood with 2 x 6 studs and walers. Multiple re-use is one of plywood's many advantages in the form field.

DFPA® TESTED QUALITY

ALWAYS SPECIFY BY DFPA GRADE-TRADEMARKS

INTERIOR PLYFORM®—standard concrete form grade made with moisture-resistant glue. Gives multiple (10-12) re-uses.

EXTERIOR PLYFORM®—standard form grade made with waterproof glue. Gives maximum (25 or more) re-uses.

OVERLAID FIR PLYWOOD—special panel with hard, glossy fused resin-fiber surfaces. Waterproof glue. Up to 200 re-uses.

FOR YOUR FILES: Complete application-specification-design portfolio assembly. Write (U.S.A. Only) Douglas Fir Plywood Association, Tacoma 2, Washington, Dept. 135.

COLORADO STREET PIONEER BRIDGE
LOCATION: Pasadena, California
CONTRACTOR: Guy F. Atkinson Co.
South San Francisco, California

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5445 North Neva Ave.
Chicago 31, Illinois

(Continued from page 122)

▲† **Donald M. Drake Co.**, 1600 N. W. Savier St., Portland, Ore., CA **$1,320,626**, earthwork, concrete lining, and structures for Block 20 laterals, wasteways, and drains, Wahluke Branch canal laterals, Columbia Basin Project, DC-4963, WASHINGTON. Bureau Reclamation, Dpt. Interior, Ephrata, Wash. Bids Oct. 15. CD 10/22.

▲ **Valley Constr. Co.**, 7722 Rainer Ave., Seattle, Wash., and **Morrison-Knudsen Co., Inc.**, 319 Broadway Ave., Boise, Idaho, LB **$1,277,242**, constr. 104,600 ft. storm sewers, HOQUIAM, WASH. City, City Hall, Hoquiam, Wash. Bids Oct. 28. CD 10/10.

▲† **The Granite Constr. Co.**, P.O. Box 900, Watsonville, Calif., LB **$3,861,295**, est. $3,750,000 (6 bidders) flood control, Proj. Levee constr. on San Lorenzo River and Branciforte Creek in Santa Cruz Co., ENG-58-1, CALIFORNIA. U. S. Eng., 180 New Montgomery St., San Francisco, Calif. Bids Oct. 24. CD 9/18.

BUILDINGS—LB & CA

† **Larsen & Co.**, 361 W 4 S. St., Salt Lake City, Utah, LB **$340,418** Base Bid 1, LB **$383,002** Base Bid 3 (11 bidders), MAINTENANCE and GENERATOR BLDG., ABU-PH-21 and 25, TUBA CITY, ARIZ. Bureau Indian Affairs, Box 1777, Albuquerque, N. M. Bids Oct. 22.

R. A. Watt, 7862 Western Ave., Los Angeles, Calif. CA **$367,500**, 35 stucco DWELLINGS, Shadygien Dr., Gillard St. and Westridge, AZUSA, CALIF. Azusa Development Co., 7862 S. Western Ave., Los Angeles, Calif.

▲ **Rothschild, Raffin & Weirick**, 274 Brannan St., San Francisco, Calif. LB **$1,145,900** Base Bid (12 bidders) MUSIC, SCIENCE, MATHEMATICS AND STATISTICAL FINANCIAL CENTER BLDG., BERKELEY, CALIF. Bd. Regents, University of California, Administration Bldg., Berkeley, Calif. CD 7/22/55.

Cesare Sellan, 5401 Thornburn St., Los Angeles 45, Calif., Owner Builds. **$360,000**, 8 APARTMENT BLDGS., Chadron St. and S. Felton Ave., Tr. 993, HAWTHORNE, CALIF.

Remco Constr. Co., P. O. Box 152, Avenal, Calif. LB **$358,175** (4 bidders) wood frame, stucco McCabe JUNIOR HIGH SCHOOL addn., MENDOTA, CALIF. Mendota Union Elementary School Dist., Box 528, Mendota, Calif. Bids Oct. 24. CD 10/10.

Murphy Bros. Ltd., 3701 Foothill Blvd., Pasadena, Calif. CA **$496,000**, 1700 sq. ft., 31 DWELLINGS lots 1-31 tr 32103 PASADENA, CALIF. Lomita Square Corp., 3701 E. Foothill Blvd., Pasadena, Calif.

J. Putnam Henck, 3947 Sierra Way, San Bernardino, LB **$542,913**, (7 bidders) rein.-masonry, tilt-up concrete end walls Edward M. Cope JUNIOR HIGH SCHOOL, REDLANDS, CALIF. Redlands School Dist., 653 Fern Ave., Redlands, Calif. Bids 10/18. CD 10/9.

▲ **Paul Wright & Ben Oretsky**, P.O. Box 2185, Santa Rosa, Calif. LB **$1,630,000** joint venture (4 bidders) base bid Montgomery HIGH SCHOOL, SANTA ROSA, CALIF. Santa Rosa City School Dist., c/o Supt., 211 Ridgeway, Santa Rosa, Calif. Bids Oct. 29. CD 10/4.

Warners Assoc., 13240 Hy. 395 Sunnymead, Calif. Owner Builds. $400,000, 1,000 sq. ft., 40 DWELLINGS 24-000 Carolyn and Eugena Sts., SUNNYMEAD, CALIF.

CANADA

HEAVY CONSTRUCTION—BA

▲ **Ontario and Manitoba**—Bids Asked—GAS PIPE LINE—Northern Ontario Pipe-Line Crown Corp., c/o Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont. (selected list of bidders) constr. Northern Ontario link of Trans-Canada Gas Pipeline; the 700 mi. link runs from the Manitoba border to Kapuskasing, Ont. $100,000,000. CD 4/27/55.

BUILDINGS—SLC

▲ **Que., Lapraire**—SCHOOL—Les Freres de l'Instruction Chretienne, Maison du Laprairie, Que., soon lets contract, 4 and 5 story, 60x100 ft. and 60x300 ft. brick, rein.-conc. Normal School, concrete fdn. with open air swimming pool, Maison Provincial. $2,000,000. Roland Dumais, 3995 Sherbrooke St. E. Montreal, archt. Archambault & Roy, 2125 Jean Talon St. E., Montreal, engrs. CD 2/27.

HEAVY CONSTRUCTION—LB & CA

▲ **Montreal Dual Mixed Concrete Ltd.**, 3701 Cote St. Michel, Montreal, Que., LB **$3,067,476**, Contr. No. 31, pavements, sidewalks and curbs, Metropolitan Blvd., MONTREAL, QUE. Montreal Metropolitan Comn., 506 St. Catherine St. E., Montreal, Que.;
Lakeshore Constr., Inc., 187 Cartier St., Pointe Claire, Que., LB **$2,885,588**, Contr. No. 32, pavements, sidewalks and curbs, etc. (Montreal, Que.);
H. J. O'Connell Ltd., 6460 Cote de Liesse, Montreal, Que., LB **$2,186,007**, Contr. No. 33, pavements, sidewalks, curbs, etc. (Montreal, Que.);
Miron Constr. Ltd., 2201 Cote St. Michel, Montreal, Que., LB **$933,225**, Contr. No. 34, pavements, sidewalks and curbs (Montreal, Que.).

▲ **Pentagon Constr. Co. Ltd.**, 5005 Namur St., Montreal, Que., CA **$3,459,000** (13 bidders) constr. Elevator B-1 and marine towers at Montreal Harbor, MONTREAL, QUE. National Harbors Bd., West Block, Parliament Bldgs., Ottawa, Ont. Bids Sept. 4. CD 10/14, under LB.

BUILDINGS—LB & CA

Howden Constr. Co. Ltd., 1877 Marine Dr., North Vancouver, B. C., CA **$820,000**, 3 story, rein.-con., brick classroom blocks JUNIOR HIGH SCHOOL with GYMNASIUM-AUDITORIUM, WEST VANCOUVER, B. C. School Dist. West Vancouver, West Vancouver, B. C. Thompson, Berwick & Pratt, 1553 Robson, Vancouver, B. C. Bids Oct. 3, awarded Oct. 24. CD 9/12.

U. S. POSSESSIONS

HEAVY CONSTRUCTION—LB & CA

▲ **The Morrison & Knudsen and Hawaiian Dredging Co.**, 555 Fell St., San Francisco, Calif., LB **$4,772,950** (4 bidders) 27,000 lin. ft. water conveyance and development tunnel, drilling wells, misc. pipe lines and diversion structures and appurtenant works, MOLOKAI, T.H. Hawaii Water Auth., for Unit I, c/o Mgr.-Chief Engr., Honolulu, T.H. Bids Oct. 24. CD 9/23.

BUILDINGS—LB & CA

▲† **M. J. Brock & Sons, Inc.**, 2894 Rowena St., Los Angeles, Calif. LB **$4,141,100** (4 bidders) 250 unit Capehart HOUSING at Fort Shafter and Tripler Army Hospital, ENG-58-2, OAHU, T.H. U. S. Eng., Honolulu Corp., Ala Moana and South St., Honolulu, T.H.

PROPOSED PROJECTS

WATER SUPPLY

▲ **Mass., North Attleboro**—Town, Bd. Water Comrs., North Attleboro, water sys. renovations, 5 Contracts, **$535,000**, Constr. 1958; 7 Contracts, **$484,000**, Constr. 1959. Whitman & Howard, Inc., 89 Broad St., Boston, consult. engr. CD 8/17/54.

Mont., Glendive—City, City Hall, **$500,000** general obligation bond issue and **$300,000** revenue bond issue election Nov. 20 to finance water imprv. plans of repairs, addns. and imprvs. Morrison-Maierle Co., Helena, consult. engrs. CD 9/23.

O., Shelby—City, Mayor Ross Sipes, City Hall, WW imprvs. and expansions. **$500,000**. Floyd G. Browne, & Assocs., Church St., Marion, consult. engrs.

SEWERS, WASTE DISPOSAL

▲ **Calif., Jurupa**—Jurupa Community Service Dist., Jurupa, bond election Dec. 10, sewer mains and laterals and treatment plant, treatment plant and site **$260,000**, mains and laterals **$1,600,000** for laterals. Bulot, Quigley & Clark, 1323 N. Broadway, Santa Ana, consult. engrs. CD 4/25.

Mo., De Soto—City, City Council, City Hall, **$750,000**. bond election Nov. 19, sewage disposal plant, auxiliaries, appurtenances and sewer extensions in various parts of city.

▲ **Neb., Omaha**—City, City Hall, Saddle Creek Sewer from Cuming and Center Sts. **$2,000,000**. E. W. Woodridge, city engr. CD 10/28/52.

Pa., Pittsburgh—City, City Hall, reconstr. trunk sewer south side of city. **$550,000**.

▲ **Tex., San Antonio**—City, City Hall, Steve Matthews, mgr., voted bonds Oct. 22, sanitary sewers. **$3,000,000**. CD 9/26.

▲ **Vt., Montpelier**—City, R. Irving, mgr., sewage treatment plant. **$1,775,000**. CD 5/28/47.

BRIDGES

▲ **Calif., Stockton**—City, City Hall, track separation and overpass El Dorado Center overpass and subway, Harding St. Subway. **$5,700,000**.

STREETS AND ROADS

▲ **Ala., Mobile**—Mobile Co., Courthouse, Mobile, 120 mi. county road paving, resurf. **$3,000,000**. CD 11/12/53.

▲ **PENNSYLVANIA**—State Hy. & Bridge Auth., 506 North Office Bldg., Harrisburg,

Beaver Co.—2.5 mi. 4-lane 10 in. rein.-con. between South Heights and Aliquippa, **$1,500,000**.

Franklin Co.—24 ft. 10 in. rein.-con. from 5.33 mi. between Fort Loudon and St. Thomas, **$1,375,000**.

Indiana Co.—5 mi. four 12 ft. lanes divided, 9 in. rein.-con. between Indiana Pa. and Homer City Boros, **$2,250,000**.

Northampton Co.—13.46 mi. two 24 ft. lanes 9 in. rein.-con. between Wind Gap, Saylorsburg and Snyderville, **$5,000,000**.

Philadelphia Co.—0.45 mi. Grays Ferry-Tasker St. 4-lane divided 10 in. rein.-con., **$2,100,000**.

Vare and 26th St., underpass 0.7 mi. 4 lane divided 10 in. rein.-con., **$1,200,000**. CD 9/17/51.

Schuylkill Co.—2.18 mi. four 12 ft. lanes b. conc. 4 ft. divisor, between Pottsville and Minersville, **$1,200,000**. S. P. Longstreet, c/o owner, ch. engr.

▲ **Tex., San Antonio**—City, Steve Matthews, mgr., voted bonds Oct. 22, street imprvs., paving **$4,500,000**. CD 9/30.

▲ **WASHINGTON**—State Hy. Comn., Olympia,

King Co.—constr. section of Tacoma-Seattle expressway from junction with Echo Lake branch of State Hy. 2 to Duwamish River. **$6,134,000**, Work to start in 1959. CD 11/27.

North West Territories—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont.,

Fort Fitzgerald—grading, culverts 23 mi. Fort Fitzgerald to Bell Rock. **$500,000**. Bids before Spring 1958.

EARTHWORK, WATERWAYS

▲ **Pennsylvania**—State Dpt. Forests & Waters, Education Bldg., Harrisburg, modernizing Erie Harbor to handle St. Lawrence Seaway Vessels, Erie Co., **$2,225,000**. Parsons, Brinckerhoff, Hall & MacDonald, 51 Broadway, New York, N. Y., consult. engrs. CD 7/24/51.

(Continued on page 129)

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Le Roi CRD one-use bits

Here are inexpensive one-use bits that'll save you time and money on any drilling job. They've got good lasting and digging qualities in any kind of rock — and when they finally do dull, they're cheap enough so you can toss 'em away with no regrets. There's no lost time or motion toting 'em around for sharpening.

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Pacific Cement and Aggregates, Inc. proves:

Pacific Cement and Aggregates has fifteen radio base stations, each handling dispatching from a batch plant. Shown above is the base station at Hayward, California (antenna at top of hopper). They now have 165 mixer trucks and 15 cars and pick-ups equipped with mobile radio.

Fewer trucks per job, less overtime with General Electric two-way radio

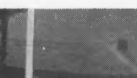
General Electric two-way radio means faster, more profitable service. That's why fast-growing Pacific Cement and Aggregates calls it "a valuable tool in selling ready-mixed concrete service to new customers."

PCA has found that two-way radio cuts down the number of trucks needed on a given job. When faced with unavoidable delays or cancellations, radio permits PCA to switch trucks immediately to other jobs.

Two-way radio lets PCA keep customers up-to-date on job progress. And when customers make corrections on final loads, this information is relayed directly to the job site. Finishing crews do not have to be held on overtime.

If a breakdown takes place, you too can send repair equipment to the exact spot within minutes. Your servicemen, dispatchers and supervisors—tied together by General Electric two-way radio—will have full knowledge of overall operations at all times.

Find out how better communications can give you more profit from present equipment. Call your local General Electric Communications consultant, listed under "Radio Communication Equipment" in the Yellow Pages. Or write: General Electric Co., Communication Products Department, Electronics Park, Syracuse, N. Y.



Drivers at the job site can instantly report any changes in orders and are under the constant control of the dispatcher. Using G-E two-way radio, PCA has achieved tighter delivery schedules and greater customer satisfaction.

Each base station can communicate by radio with adjacent PCA plants, co-ordinating the movements of concrete trucks delivering out of more than one plant, or in those cases where two plants are providing concrete for one job.

GENERAL ELECTRIC

(Continued from page 126)

▲ **Tex., San Antonio**—City, City Hall, voted bonds Oct. 22, drainage open and closed. $12,000,000. CD 9/26.

AIRPORTS

Conn., Windsor Locks—AIRCRAFT HANGAR—State P. Wks. Dpt., 165 Capitola Ave., Hartford, plans by Rossetti & DiCoria, 728 N. Main St., West Hartford, aircraft hangar, Bradley Field. $600,000. John P. Legnos, 30 Gillet St., Hartford, consult. engr. A. Bruce Onderdonk, 119 New London Turnpike, Glastonbury, owners-staff engr. CD 5/15/56.

▲ **N. Y., Idlewild**—COMMISSARY BLDG.—Port of New York Auth., 111 Eighth Ave., New York, Zone 11, plans by Louis A. Abramson, 25 W. 45 St., New York, Zone 19, central commissary bldg., New York International Airport, $1,500,000. CD 2/25/53.

LATIN AMERICA

▲ **Ecuador**—Empressa Electrica "Quito" S. A., Quito, Ecuador is inviting construction companies to submit qualifications for constr. Cumbaya Hydro-electric project. Documents may be obtained on or before Nov. 2, from owner or from R. J. Tipton Associated Engineers, Inc., Insurance Bldg., Denver, Colo., U. S. A., on deposit of $330.

▲ **Mexico, Mexico City**—Industria de Telecommunication, Inc., c/o Fed. Dpt. Pub. Wks. and Communications, Mexico City, plans telephone factory to mfg. telephone instruments and other equipment. $4,000,000.

U. S. POSSESSIONS

▲† **Hawaii, Hickam Air Force Base**—HOUSING—Pacific Air Force Headquarters, U. S. Air Force, APO 953, San Francisco, Calif., plans by Groll, Beach & Assocs., archts.-engrs., 1434 Makaloa St., Honolulu, Hawaii, 600-unit Capehart family housing. $9,720,000. Bids about January 1958.

AMERICANS ABROAD

▲ **Norway**—PLANT—A/S Esso-Raffineriet, Norge (Standard Oil Co. of N. J., Rockefeller Plaza, New York, N. Y., U. S. A.), plans plant to process 40,000 bbls. oil in Southern Norway. $30,000,000.

PUBLIC BUILDINGS

Calif., Anaheim—SCHOOL—Magnolia School Dist. plans by Frick & Frick, 340 N. Altadena Dr., Pasadena, 18,000 sq. ft., frame, stucco Maxwell Elementary School addn. $500,000.

▲ **Calif., Cupertino**—SCHOOLS—Cupertino Union Elementary School Dist., Cupertino, bond election Nov. 5, school constr. $8,000,000. CD 10/10/56.

▲† **Calif., Lathrop**—RADIATION CENTER—Atomic Energy Comn., 1901 Constitution Ave. N.W., Wash. 25, D. C., has suspended development of food irradiation reactor at Sharpe General Depot. $3,000,000. CD 11/19/56.

Calif., Linden—SCHOOL—Linden Union H.S. Dist., c/o Supt., Box 538, bond election Dec. 17, site development and addl. classrooms at Linden Union High School. $635,000. CD 8/29.

▲ **Calif., Marysville**—COURTHOUSE—Yuba Co., c/o Clerk, Courthouse, Marysville, courthouse. $1,000,000. CD 2/16/55.

▲ **Calif., Monrovia-Duarte**—SCHOOL—Monrovia-Duarte High School Dist., voted bonds Oct. 22, finance completion of new 4 year Duarte High School and rehabilitate present high school, $1,950,000. CD 7/17.

▲ **Calif., Oakland**—SCHOOL—Oakland Unif. School Dist., c/o Supt., 1025 2nd Ave., plans by Anderson, Hyde & Anderson, Bank of America Bldg., school rebuilding program at Castlemont High School. $3,433,000. CD 6/8/56.

Colo., Pueblo—STUDENT CENTER—Pueblo Junior College, 900 W. Orman Ave., plans by Walter DeMordaunt, 738 Thatcher Bldg., student center bldg. $700,000. $600,000 FHA loan tentatively approved.

Conn., Bridgeport—SCHOOL—Regional School Dist. No. 5, 1211 Fairfield Ave., Junior High Schools for towns of Bethany, Orange, and Woodbridge. $500,000.

Conn., Danbury — PHYSICAL EDUCATION — State P. Wks., Dpt., 165 Capitol Ave., Hartford, plans by Philip N. Sunderland, 81 West St., physical education bldg. addn., Danbury. State Teachers College. $750,000. CD 9/18.

▲ **Conn., Dayville**—SCHOOL—State P. Wks. Dpt., 165 Capitol Ave., Hartford, plans by Golden-Storrs, Inc., 343 Fairfield Ave., Hartford, Howard H. Ellis Regional Technical School, DAYVILLE, CONN. $2,500,000. John P. Legnos, 30 Gillett St., Hartford, consult. engrs. CD 8/31/56.

Conn., Fairfield—SCHOOL—Town, Town Hall, plans by Lyons & Mather, 211 State St., Bridgeport, North Mill Plain Elementary School. $500,000. Howard W. Harper, 1429 Mill Hill Rd., Southport, consult. engr. Walter T. Smith, 117 East State St., Westport, mechanical engr.

▲ **Conn., Seymour**—HIGH SCHOOL—Town, Town Hall, plans by Schilling & Goldbecker, 18 Trumbull St., New Haven, high school, Bungay Rd. $1,200,000. Val J. Carlson, 433 Howe St., Shelton, consult. engr. CD 9/17.

▲† **Fla., Tampa**—STATE UNIVERSITY—Fla. State Bd. Control, J. B. Culpepper, secy., Tampa, plans by Robert M. Little, 2180 Brickell Ave., Miami, Mark Hampton, Stoval, Professional Bldg., Tampa, Pullara, Bowen & Watson, 2910 Grand Central, Tampa, Gamble, Pownal & Gilroy, 1407 Las Olas Blvd., Fort Lauder-

for pumping domestic and industrial wastes...

This Shone ejector has been in operation for 68 trouble-free years—in the Auditorium Hotel (Roosevelt College), Chicago, Illinois.

YEOMANS pneumatic ejectors cut service costs because

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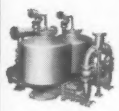

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dale, Smith, McCandless & Hamlyn, 20 Park St. N., St. Petereburg, assoc. archts. and Guy C. Fulton, superv. archt., Bldg. E., University of Florida, Gainesville, State University, Temple Terrace. $6,000,000.

▲ **Ind., Michigan City** — SCHOOL — School, City of Michigan City, Spring and Detroit Sts., plans by Boyd E. Phelps, Inc., 1000 Washington St., 2 story, brick Junior High School, Coolspring and Woodland Aves., Lakeland. $1,250,000.

Iowa, Guthrie Center—SCHOOL—Bd. Educ., Norine B. Twedt, secy., voted $595,000 bonds, elementary school. James A. Dougher, 302 Garver Bldg., Des Moines, archt. CD 2/12.

▲ **La., Scotlandville**—DORMITORIES—State Dpt. Educ., c/o Shelby M. Jackson, supt., State Capitol Bldg., Baton Rouge, plans by Burk, LeBreton & Lamantia, 632 Pirates Alley, New Orleans, Men's Dormitory No. 1, $650,000; Men's Dormitory No. 2, $450,000; Men's Dormitory No. 3, $500,000, at Southern University of Louisiana. A. A. Salzer & Assocs., 1026 Beinville, New Orleans, consult. engrs.

Mass., Dartmouth—SCHOOL—Supt. Schools, 366 Slocum Rd., North Dartmouth, plans by Stoner Assoc., 53 State St., Boston, Mass., elementary school, Slocum St., North Dartmouth. $500,000. Constr. 1958. CD 2/26.

Mass., Dartmouth—SCHOOL—Town of Dartmouth, c/o School Dpt., 366 Slocum Rd., North Dartmouth, plans by Stoner Assoc., 53 State St., Boston, elementary school, Pandanaram area-Russell Mills Rd., South Dartmouth. Approx. $360,000. CD 2/26; Junior High School, Slocum St., Dartmouth, $500,000, Constr. 1958.

Mich., Detroit — BINDERY, etc. — City, Pub. Library Comn., 5201 Woodward St., library sys., constr. bindery and shops building, $500,000. Obligation bond financing. M. F. Wagnitz, 528 City-County Bldg., Zone 28, engr.

▲ **Mich., Grand Rapids**—SCHOOL, etc.—City, Rogers Public Schools, 1351 Buckingham S.W., voted bonds Oct. 22, Music Building and Physical Education Bldgs. at high school and elementary school. $1,160,000. CD 9/17.

▲ **Mich., Redford**—SCHOOL—Bd. Educ., South Redford School Dist., Redford, Junior High School, Beech and Orangelawn. $1,800,000.

Mich., Hemlock—SCHOOL—Bd. Educ., Hemlock Schools, voted 10 mill buliding fund Oct. 18, high school. $750,000. CD 10/18.

Mo., Neosho—HOSPITAL—Newton Co. Comm., Neosho, defeated $908,000 bonds Oct. 22, constr. and equip. 100-bed county hospital. CD 10/3.

Mo., Nevada—DORMITORY—Div. P. Bldgs., State Capitol Bldg., Jefferson City, plans by Voskamp & Slezak, 18 E. 11, Kansas City, Mo., dormitory for State Hospital No. 3, $500,000. Bids probably February 1958.

▲ **Mo., St. Louis**—ADMINISTRATION, etc.—Missouri School for Blind, Bd. Advisors, George Heltzell, supt., 3815 Magnolia Ave., Zone 10, brick, concrete, steel, etc. addns. incl. 4 story, 50x90 ft. administration and infirmary section; 2 story, ground floor, each 87x50 ft. dormitory wings; 2 story, 37x67 ft. classroom section and 2 story, 37x68 ft. superintendent quarters, $1,000,000. Pearce & Pearce, Inc., 721 Olive St., Zone 1, archt. Bids about Jan. 6.

▲ **N. J., New Brunswick**—HALL OF FAME—Rutgers University, College Ave., plans by York & Sawyer, 101 Park Ave., New York, N. Y., part 1 story, part 2 story, brick or limestone Hall of Fame on Rutgers Campus for National Football Foundation, To be constr. in 2 phases, the first to cost approx. $2,500,000. Total $4,000,000-$4,500,000.

▲ **N. J., North Bergen**—SCHOOL—Bd. Educ., Twp. of North Bergen, plans by Frederick Wiedersum Assocs., 85 W. Hawthorne Ave., Valley Stream, N. Y., and Clifton, N. J., school, sites being studied on 76th St. and Hudson Blvd. $2,750,000. CD 5/16/56.

▲ **O., Cincinnati**—SCHOOL—Bd. Educ., 608 E. McMillan St., plans by Potter, Tyler, Martin & Roth, 128 E. 6th St., 1 and 2 story, brick, structural steel, second South Avondale School, Carll St., $1,240,000. P. H. Ziel & Assoc., Reakirt Bldg., engrs. CD 2/29/56.

▲† **O., Cleveland**—HOSPITAL—Veterans Admin., Vermont Ave., between H and I Sts. N. W., Wash. 25, D. C., 800-bed general hospital, E 105 St. and East Blvd. $10,000,000. ($1,100,000 appropriated). CD 9/8/55.

Ore., Portland—SCHOOL—Union High School Dist. No. 3, 1500 SW 130th Ave., plans by Annand, Boone & Lei, 1530 SW Taylor St., David Douglas High School addn. $900,875. Bonds voted.

Pa., Glen Rock—SCHOOL—Southern Joint Schools, R. D. 3, elementary school. $560,550. Project approved by Pa. Dpt. Public Instruction.

▲ **Tex., Corpus Christi**—COURTHOUSE—Nueces Co., c/o Courthouse, plans by Smyth & Smyth, Gulf Security Bldg., courthouse. $2,000,000-$3,000,000. CD 10/4.

▲ **Tex., San Antonio**—POLICE—City, Steve Mathhews, mgr., defeated bonds Oct. 22, police bldg. $2,750,000. CD 9/26.

▲† **Utah, Fort Douglas**—FEDERAL—General Service Admin., Bldg. 41, Denver Federal Center, Denver, Colo., 2 story federal bldg., on Govt. property, Sunnyside Ave. $7,600,000. CD 11/15/55.

Wash., Edmonds—SCHOOL—School Dist. 15, plans by Miller & Morris, Edmonds, Westgate Grade School, west of here, $500,000. CD 10/11.

▲ **Wis., Eau Claire**—LIBRARY—Wisconsin State Colleges Bldg. Corp., Madison, plans by Foeller, Schober, Berners, Safford & John, 310 Pine St., Green Bay, library, $1,000,000. Constr. in summer 1958. CD 9/21/54.

Wis., Stevens Point—FIELD HOUSE—Wis. State Colleges Bldg. Corp., Madison, plans by Schubert, Sorensen & Assocs., 308 Hoeschler Bldg., LaCrosse, field house. $800,000.

COMMERCIAL BUILDINGS

▲ **Ala., Birmingham**—HOSPITAL—Birmingham Baptist Hospital, 708 Tuscaloosa Ave., plans by Lawrence Whitten, Brown-Marx Bldg., Birmingham Highland Baptist Hospital. $3,000,000. CD 6/27/56.

▲ **Calif., Oakland**—MEDICAL—Owner, c/o Nakahara & Nakahara, archts., 2520 Shattock Ave., Berkeley, 50,000 sq. ft. Medical Bldg., 40th St. $2,000,000.

▲ **D. C., Wash.**—DORMITORY—American University, Massachusetts and Nebraska Ave. N.W., Wash., D. C., plans by Faulkner, Kingsbury & Stenhouse, Ring Bldg., constr. Dormitory "E", $1,250,000. CD 5/8/56.

Fla., Miami—MOTEL—Gen Gaines, c/o MacKay & Gibbs, archts., 927 Arthur Godfrey Rd., Miami Beach, 3 story, 60x350 ft. CBS-Air-conditioned motel, NW LeJuene Rd. and 24th St. $750,000. H. J. Ross, 1035 Biscayne Blvd., structural engr. L. F. Weiss, 302 Bird Rd., Coral Gables, plbg. engr.

▲ **Ill., Evergreen Park**—HOSPITAL—Little Company of Mary Hospital, 2800 W. 95 St., hospital addn. and development program, $4,200,000. Vern. G. Alden Co., 33 N. LaSalle St., Chicago, consult. engr.

Ind., Donaldson—SEMINARY—Divine Heart Seminary, plans by Henry R. Slaby, 2750 N. Teutonia Ave., Milwaukee, Wis., 3 story seminary addn. $700,000. Bids soon.

Ky., Louisville—GYMNASIUM, etc.—Bellarmine College, Newburg Rd., plans by Thos. J. Nolan & Sons, Ky. Home Life Bldg., 5th and Jefferson Sts., Zone 1, gymnasium and field house, over $700,000. Fund raising drive under way.

▲ **Mass., Watertown**—APARTMENTS—Michael M. Iodice, 151 Warren St., Watertown, Mass., plans by John G. Danielson, 16 Court St., Boston, 18 apartments. $1,000,000. Constr. 1958.

Minn., Minneapolis—INFIRMARY—Ebenezer Home for the Aged, N. E. Quam, supt., 2647 Oakland Ave., plans by Lang & Raugland, 802 Wesley Temple Bldg., 100 single room addn. $700,000. CD 10/17.

Minn., St. Paul—BANK—Midway National Bank of St. Paul, 1587 University Ave., plans by Bergstedt & Hirsch, 2706 West Blvd., 2 story, bsmnt., 115x98 ft. bank, University Ave. and Roy St. $600,000. Constr. next spring.

▲ **Mo., Kansas City**—RESEARCH DEPARTMENT, etc.—University of Kansas City, School of Dentistry, Dr. Joseph F. Jacobs, 5100 Rockhill Rd., classrooms, research dpt. and dental clinic, $2,000,000. Fund raising under way, will seek Federal Aid.

▲ **Mo., St. Joseph**—HOSPITAL—St. Joseph's Hospital, c/o Sister Marguerita, St. Joseph, plans by Everett Johns, 517½ Francis St., 6 story, bsmnt. hospital, air-conditioned. $3,500,000-$4,000,000. W. L. Cassell, 912 Baltimore, Kansas City, Mo., engr. CD 11/21.

▲ **N. J., Burlington**—DEPARTMENT STORE, etc.—Robert G. Bloomer Co., Sunset Rd., plans by The Ballinger Co., 1625 Race St., Phila, Pa., 9 story department store and office bldg., replacing present Birch Bldg. on High St. $1,250,000.

▲ **N. J., Somers Point**—MOTEL, etc.—Richard McLain & Assocs., General Wayne Inn, Wayne, Pa., motel, yacht club, lagoons and restaurant, on 40 acre site. $2,000,000.

▲ **N. J., Trenton**—SHOPPING CENTER—Hamilton Center, Inc., Myron Osberg, Box 187, Clifton, plans by Peter H. Holley, Hawthorne, shopping center, 25 stores, 1,500 car parking area. $1,000,000.

▲ **N. M., Albuquerque**—DWELLINGS, etc.—Mossman-Gladden Constr. Co., 4805 Manual Blvd. N.E., 2,000 dwellings and utilities, $40,000,000. 6 year program.

O., Cincinnati—HOSPITAL—Cincinnati Osteopathic Hospital Assn., 2076 Elm St., Norwood, plans by John Burgess, 128 Lakeview, Battle Creek, Mich. and Robert Cromer, 18 E. 4th St., Cincinnati, 1 story, bsmnt. 58-bed Hospital, Galbraith and Kenwood Sts. $600,000. Bids early 1958. CD 9/16.

O., Columbus—Y. M. C. A. BLDG.—Young Men's Christian Assn., 40 W. Long St., relocation of present Spring St. Y.M.C.A. to a site on Woodland Ave., $750,000.

O., Columbus—RESIDENCE HALL—Young Womens Christian Assn., 65 S. 4th St., Y.W.C.A. Residence Hall to replace existing bldg., 4th and Oak Sts. $770,000.

▲ **O., Parma**—STORE—May Co., Euclid Ave. at Ontario, Cleveland, Zone 14, plans by Victor Gruen Assoc., 8460 Sta. Monica, Los Angeles, Calif., 4 story, 300,000 sq. ft., branch store in Parmatown Shop Center. $7,000,000. CD 7/9.

▲ **O., Youngstown** — LIBRARY, etc. — Bd. Trustees, Youngstown University, plans by Kling & Frost, 661 Wick Ave., 3 story, bsmnt. Library-Science Bldg. $1,000,000.

Tex., Abilene—NURSING SCHOOL—Hendrick Memorial Hospital, M. Collier, admin., 19th and Hickory Sts., School of Nursing. $350,000-$700,000.

▲ **Tex., Dallas**—OFFICE—Blue Cross Hospital Service, 2208 Main St., plans by Thomas, Jamerson &

(Continued on page 134)

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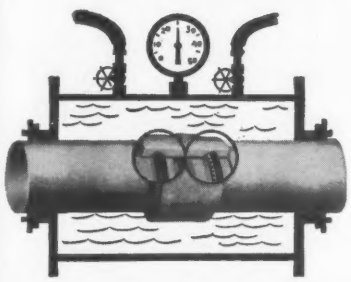

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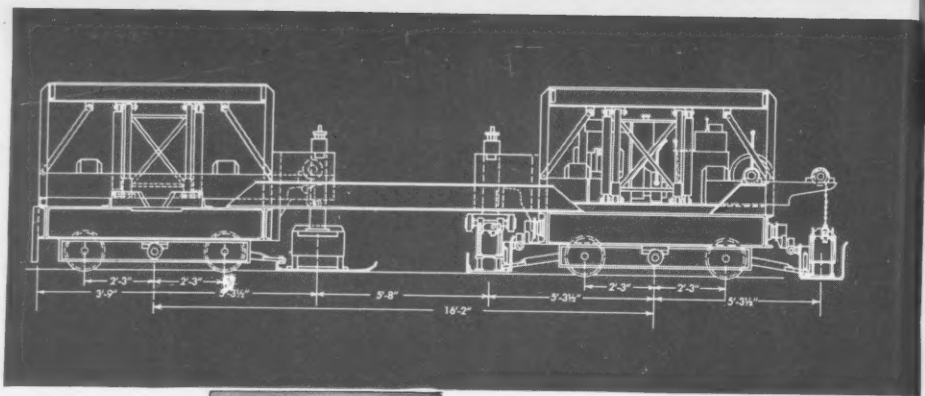

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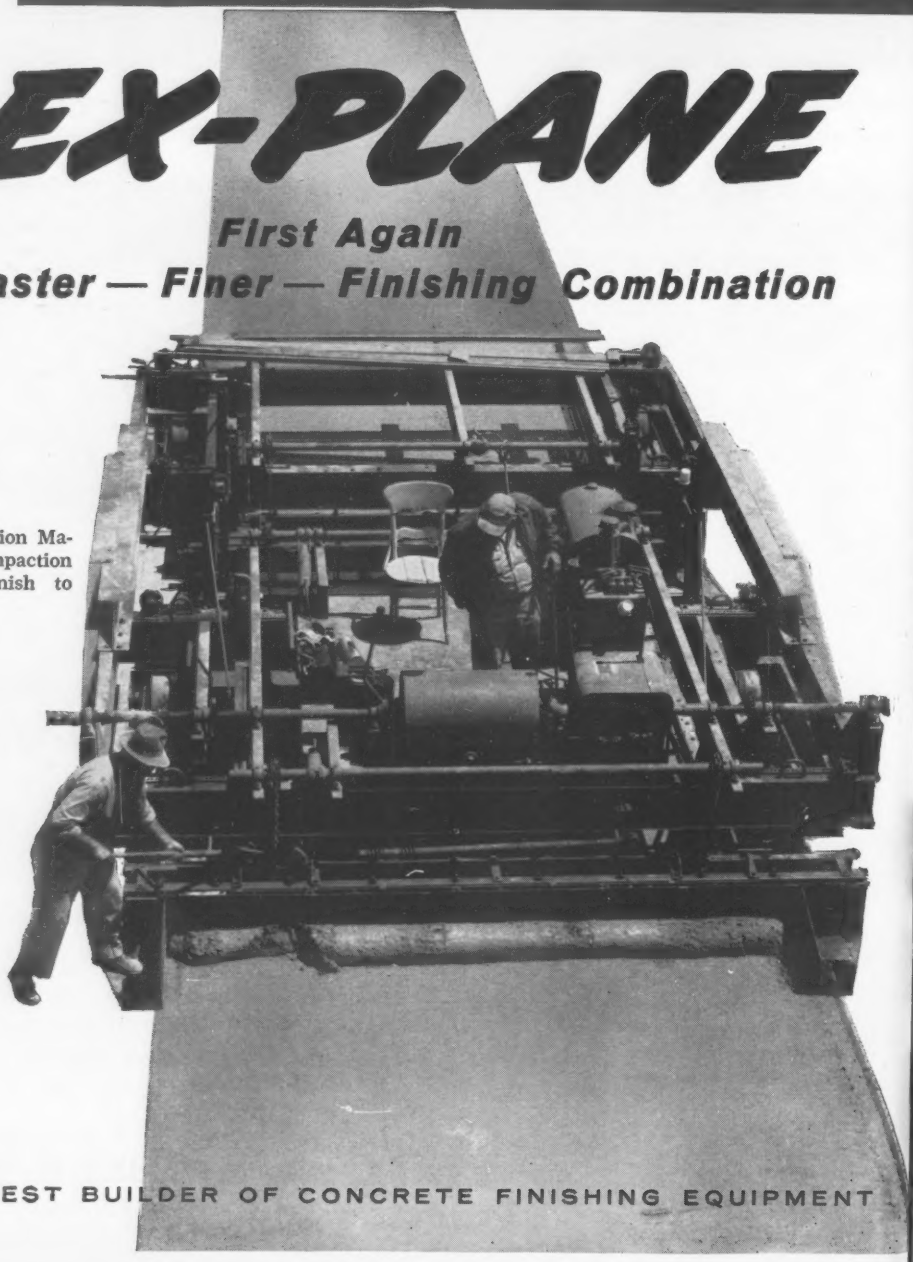

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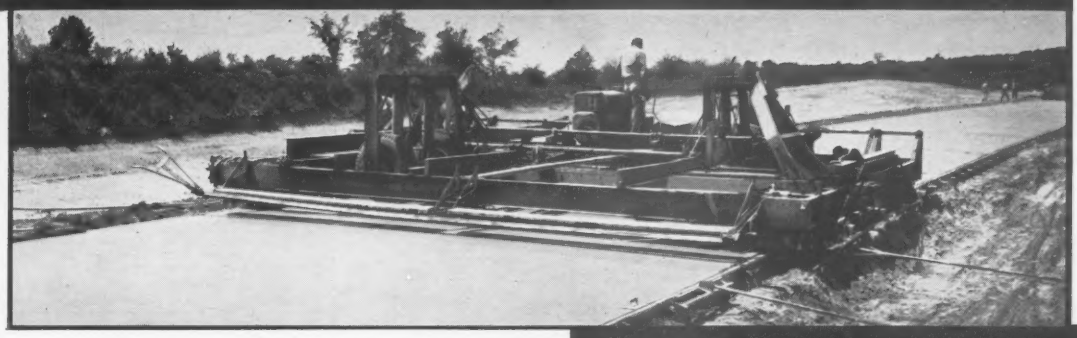

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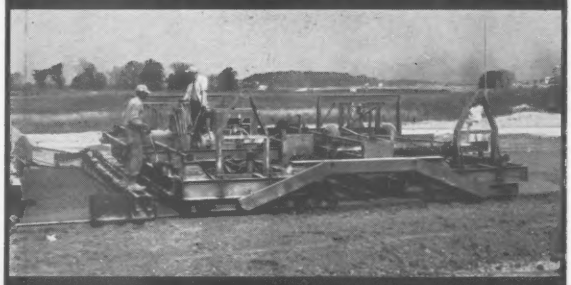
368

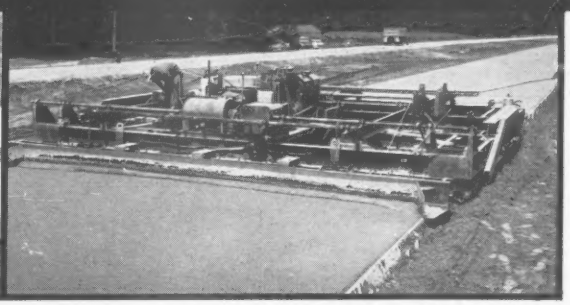
U. S. ROUTE 30 — J. A. Jones Construction Company uses combination on straightaway paving — Flexplane self-widener on interchanges near Mansfield, Ohio.



CONNECTICUT TURNPIKE—DeLillo Construction Company's Combination cuts hand finishing to a minimum.

U. S. ROUTE 12—Kalamazoo, Mich., bypass is worked by Carl Goodwin & Sons. Contractors generally report substantial savings over previous finishing methods.

U. S. ROUTE 23—Combination Machine owned by Denton Construction Company keeps up with three dual drum pavers south of Brighton, Michigan.



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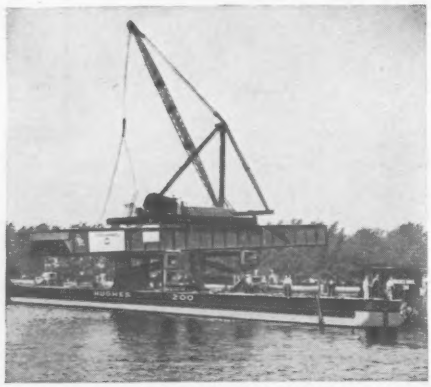

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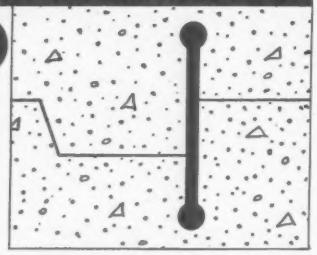

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(Continued from page 130)

Merrill, proj.-archts., 820 N. Harwood St. 12 story, bsmnt., 2 penthouses, office bldg., Main and N. Central Expressway. $3,000,000.

▲ **Tex., Dallas**—SHOPPING CENTER—Preston Forest Village, c/o Thos. P. Brennan, Jr. and Associatec Brennans and Mrs. Geo. Graffeo, 2231 Butler St., plans by Richard E. Bennett, proj.-archt., Arlington, shopping center, Preston Rd. at Forest Lane. $1,750,000.

Tex., Fort Worth—NURSES DORMITORY—Harris Hospital, c/o O. C. Armstrong, chn. Bd., 1300 W. Cannon St., plans by Preston M. Geren, 1607 Fort Worth Natl. Bldg., 3 story, bsmnt., concrete frame and floors, face brick, steel and aluminum windows, air conditioned nurses dormitory, 1400 Blk. Pruitt St. $800,000. CD 6/21/54.

Tex., Houston—CLUB, etc.—Bayou Bend Boat & Country Club, Eddie Mason, Jr. chn., 2707 Rosedale Ave., club bldg. and allied facilities on 250 acre tract purchased known as the Dickison tract, $800,000. Constr. early 1958.

▲ **Tex., Houston**—SHOPPING CENTER—J. P. Boone Real Estate, 4320 Alief Rd., plans by Lucian Hood & Zimmerman & Bible, 1116 Hawthorne St., shopping center. $7,000,000.

▲ **Tex., Houston**—APARTMENT, etc.—Martin Nadelman, c/o Shamrock Hotel, plans by Lloyd & Morgan, 4605 Montrose Blvd., 150 unit Garden-type apartments, 2 swimming pools on 3 acre site on Richmond and Graustark Ave. $1,000,000.

Tex., Marshall—HOTEL, etc.—Earl Hollandsworth & Lee Travis, Longview, 7 story, 25 room hotel renuvations and addn., incl. swimming pool. $500,000.

Tex., San Angelo—HOSPITAL—St. John's Hospital, Sisters of Charity of the Incarnate Word, plans by Don Goss, 510 Chadbourne Bldg., hospital addn. $500,000.

▲ **Tex., Texas City**—HOTEL, etc.—Community Planning Com., c/o Dee Walker, chn., Texas City (sponsors) 6 story, bsmnt., 125 room hotel, $1,500,000; rein.-con. outdoor swimming pool, $75,000. CD 10/10.

Tex., Tyler—EDUCATIONAL—First Baptist Church Congregation, plans by Melvin J. Gates, Box 241, educational bldg. $750,000.

▲ **Wash., Parkland** — ADMINISTRATION, etc. — Pacific Lutheran College, Parkland, constr. administration-classroom structure, converting 2 floors of Old Main Hall for dormitory use and altering classroom structure for science department. $1,000,000.

Que., Quebec City—SCHOOL—Protestant Bd. School Comrs. of Quebec, 945 Belvidere St., school, Ste. Foye Rd. and Holland Ave. $500,000.

INDUSTRIAL BUILDINGS

Calif., San Leandro—TRUCKING TERMINAL—Watson Bros. Transportation Co., 812 Fruitvale Ave., Oakland, trucking terminal, on 8 acre site, 137 and West Aves. $500,000.

▲ **Calif., Saratoga**—PLANT—Paul Masson Vineyards, 1256 Market St., San Francisco, plans by John S. Bolles, A1A, Pier 5, San Francisco, winery on 17 acre site off Saratoga Ave., incl 2 bldgs. (1) 11,000 sq. ft. reception room and wine testing hall (2) 121,600 sq. ft. bldg. for processing wines. $2,000,000. Chin & Hensolt, 555 Sutter St., San Francisco, consult. engrs. CD 9/6.

▲ **Fla., Miami**—HEADQUARTERS—Atlantic Coast Line R.R., L. E. Bates, ch. engr., Atlantic Coast Line Bldg., Wilmington, N. C., plans by Kemp, Bunch & Jackson, 33 S. Hogan, Jacksonville, 15 story general headquarters bldg. $13,000,000.

▲ **Mich., Allen Park**—WAREHOUSE etc.—Montgomery Ward & Co., 75 Varick St., New York, N. Y., warehouse and distribution center, Southfield St. near Willow Run Expressway. $2,000,000.

O., Cincinnati — PLANT — American Compressed Steel Corp., 900 E. Front St., plant to bale steel, on 14 acre site, east of Wilmer Ave., between Kellogg and Airport, $750,000.

▲ **Pa., King of Prussia**—PLANT—Phila. Gear Works, Inc., G St. and Erie Ave., Phila., plant expansion. $1,000,000. Site purchased, The Ballinger Co., 1625 Race St., Phila., archt. for preliminary surveys.

▲ **Tex., Houston**—PRODUCTION PLANTS—The Drilling Fluids Corp., 2201 W. Holcombe Blvd., production plants expansion. $1,000,000.

▲ **Wash., Bellevue**—PLANT—United Control Corp., 4540 Union Bay Pl., Seattle, 100,000 sq. ft. electronics mfg. plant. $1,500,000. Work to start next year.

UNCLASSIFIED

▲ **Ill., Chicago**—ELEVATED STRUCTURE, etc.—Chicago Transit Auth., Merchandise Mart, Zone 54, elevated structure and 2 tracks N. of Wilson Ave. L Station and S. of St. Lawrence Ave. Station. $1,800,000. Paul Rogers & Assocs., 20 E. Jackson Blvd., consult. engrs. CD 2/12.

Missouri—TELEPHONE LINES—A & M Telephone Co., W. R. Trowbridge, pres. and genl. mgr., Springfield, sys. imprvs. and exten. telephone lines, etc. in Douglas, St. Clair, Hickory, Polk and Wright Counties. $858,000.

▲ **New York**—SUBWAY—New York Transit Auth., 370 Jay St., Brooklyn, Zone 1, Chrystie St. Subway incl. tracks from 9 to 31st Sts. on Ind.-Sixth Ave. Line, and from 52 to 57nd St. on BMT. $10,227,400 voted by Bd. Estimate. CD 8/31/45.

Tex., San Antonio—PARKS—City, City Hall, Steve Matthews, mgr., defeated bonds Oct. 22, parks. $846,000. CD 9/26.

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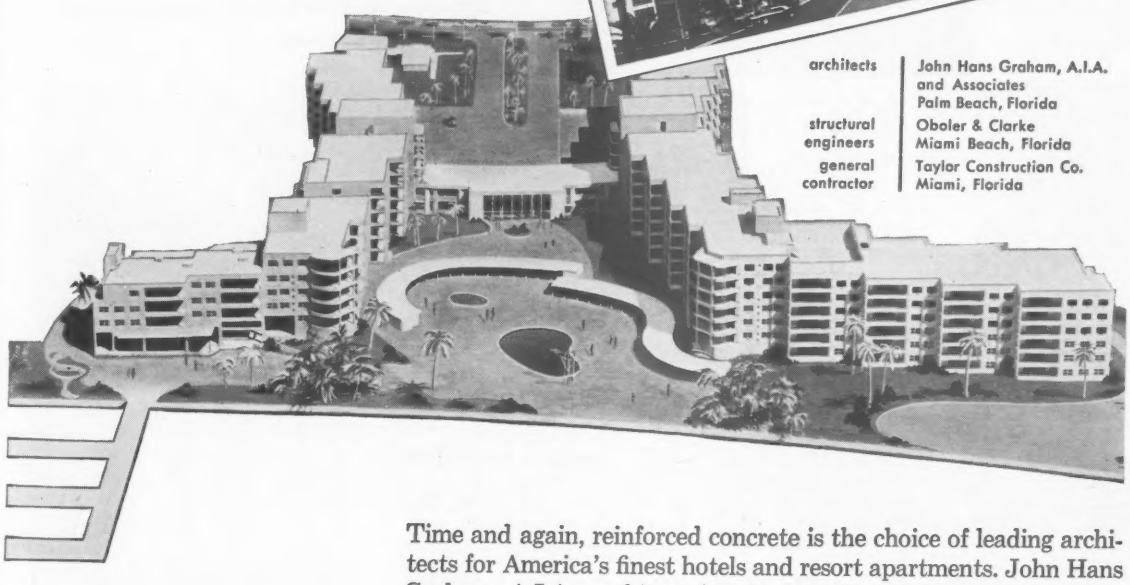

architects	John Hans Graham, A.I.A. and Associates Palm Beach, Florida
structural engineers	Oholer & Clarke Miami Beach, Florida
general contractor	Taylor Construction Co. Miami, Florida

Time and again, reinforced concrete is the choice of leading architects for America's finest hotels and resort apartments. John Hans Graham, A.I.A., architect for the luxurious Palm Beach Towers, states, "The speed of construction, the resultant economy, and the ease of cantilevering were invaluable assets that more than justified the choice of reinforced concrete."

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This beautiful, new overpass erected at Winthrop, Maine has sidewalk railings made of Continuous Weld Yoloy Steel Pipe. Yoloy's extra strength and excellent corrosion-resistance are qualities required for applications of this type.

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Maine chose Yoloy! It proved so easy to fabricate and weld that 2 additional Maine bridges will have Yoloy railings. This nickel-copper alloy steel also demonstrates added strength and longer life making it an ideal structural pipe!

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OVERPASS AT WINTHROP, MAINE ERECTED FOR THE BRIDGE DEPARTMENT OF MAINE STATE HIGHWAY COMMISSION. YOLOY PIPE WAS SOLD THROUGH JOBBER W. L. BLAKE CO., PORTLAND, MAINE, TO BANCROFT & MARTIN ROLLING MILLS CO., SOUTH PORTLAND, WHO FABRICATED THE BRIDGE RAILINGS. CIANCHETTI BROS., INC., PITTSFIELD, MAINE, ERECTED THE SECTIONS FOR GENERAL CONTRACTOR H. E. SARGENT, INC., STILLWATER, MAINE.

PHOTOS COURTESY OF MAINE STATE HIGHWAY COMMISSION.

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Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

STREETS AND ROADS

November 19 Massachusetts

BUILDINGS—BA

▲ **Mass., Worcester**—PARKING GARAGE—BA 11/27—City, Off-Street Parking Bd., c/o city mgr., City Hall, Contract P-57-4, multi deck Parking Garage, Pearl and Elm Sts. $1,050,000. Plans deposit $50. L. W. Briggs Assoc., Inc., 90 Park Ave., archt. Lester W. West, 306 Main St., engr. CD 4/3.

BUILDINGS—LB & CA

▲ **Granger Constr. Co., Inc.**, 306 Main St., Worcester, Mass., CA $1,433,324, U-803R LIBRARY addn., University of Mass., AMHERST, MASS. Commonwealth Mass., Dpt. Educ., c/o Div. Bldg. Constr., 38 Chauncy St., Boston, Mass. Bids Oct. 25. CD 10/29.

▲ **L. C. Cyr Constr. Co.**, 20 Island St., Lawrence, Mass., LB $1,100,000, est. $1,000,000. HOSPITAL addn., alterations, Buttonwoods Ave., HAVERHILL, MASS. City, Supt. Bldgs., City Hall, Haverhill, Mass. Bids Nov. 1. CD 10/23.

▲ **Manni Bldg. Co.**, 1415 Atwood Ave., Johnstown, R. I. LB $1,299,000. general contr. No. 182. Bids No. 182, 183, 184 and 185, Proj. HOS for 1-2-3 and 4 GERIATRICS BLDG. No. 2 at Howard R. I. State Hospital, HOWARD, R. I. State R. I. & Prov. Plants, Div. Purchase, State House, Providence, R. I. Bids Nov. 4. CD 10/29, under LB.

Terra-Mor Developments Corp., c/o R. Blickle, 1060 Ridge Rd., Hamden, Conn. Owner Builds. $900,000. RESORT HOTEL and yacht basin, 3 swimming pools, OLD SAYBROOK, CONN. CD 8/16.

▲ **Liberty Homes, Inc.**, 1305 Main St., Hartford, Conn. Owner Builds $1,112,000, 40 HOUSES, First Section, Fox Ridge, Maple St., WETHERSFIELD, CONN. CD 3/15.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

STREETS AND ROADS

November 19 New Jersey

BUILDINGS—BA

▲ **Pa., Phila**—HOSPITAL—BA 11/26—Schmidt, Garden & Erikson, engrs.-archts., 104 S. Michigan Ave., Chicago, Ill., hospital addns., alterations, for Chestnut Hill Hospital, 8825 Germantown Ave., Phila., Pa. $1,500,000. CD 2/21/56.

▲† **N. J., Princeton**—LABORATORIES, etc.—BA 12/8—U. S. Atomic Energy Comn. (Princeton New Jersey University, owner's agent), 70 Columbus Ave., New York, N. Y., laboratories and administration bldgs., James Forrestal Research Center. $2,000,000. Walter Kidde Constructors, Inc., 140 Cedar St., New York, N. Y., engr. CD 2/25.

HEAVY CONSTRUCTION—LB & CA

▲ **Howard & Sprague**, 656 State St., Binghamton, N. Y., LB $3,355,025 general contract No. 1, water filtration project, BINGHAMTON, N. Y. Bd. Contract & Supply, Council Chambers, City Hall, Binghamton, N. Y. Bids Oct. 30; CD 9/23;
Lewis N. Picciano & Sons, 1204 N. Hill St., Endicott, N. Y., LB $50,285, Contr. III, heating and ventilating for water filtration (Binghamton, N. Y.);
Lord Electric Co., 10 Rockefeller Plaza, New York 20, N. Y., LB $317,500, Contr. IV electrical work for water filtration (Binghamton, N. Y.).

▲ **MARYLAND**—State Rds. Comn., 108 E. Lexington St., Baltimore, Zone 2, Bids opened 11/5
Williams Constr. Co., Middle River, Md., LB $1,909,259 (8 bidders), grading, drainage, surf. 1.884 mi. Baltimore-Harrisburg Expressway, also dual bridges over P.R.R., Little Falls Creek, B-578-32-420, Baltimore Co. CD 10/24.

BUILDINGS—LB & CA

▲ **Turner Constr. Co.**, 150 E. 42 St., New York 17, N. Y., CA Est. $7,000,000, 18 story PLANT OFFICE addn., 42 St. between Second and Third Aves.; CA Est. $2,000,000, 5 story PRINTING PLANT addn. and 2 story GARAGE addn., 41 St., NEW YORK, N. Y. New York Daily News, 220 E. 42 St., New York 17, N. Y. Harrison & Abramowitz, 630 Fifth Ave., New York 20, N. Y., archts. CD 5/10.

Tendall Garden Homes, 671 Ridgewood Rd., Maplewood, N. J., Own Forces, $825,000, 37 addnl. HOMES in section on Brook St. and Park Ave. adjoining Berkeley Gardens, BERKELEY HEIGHTS, N. J. Erwin Gerber, 11 Commerce St., Newark, N. J., archt.

▲ **Princeton Constr. Co.**, 470 Georges Rd., New Brunswick, N. J., Separate Contracts. $4,000,000, 164 unit RESIDENTIAL DEVELOPMENT, Princeton Twp., Shady Brook, PRINCETON, N. J.

▲ **C. DeChiccis & Co.**, 639-3 St., Clairton, Pa. LB $1,546,884, brick, block, steel,, 40 room JUNIOR HIGH SCHOOL, Harding Ave. and Marn St., ALIQUIPPA, PA. School Dist. Aliquippa, Aliquippa, Pa. Bids Oct. 28. CD 10/4.

▲ **United Constr. Co.**, 1204 Lincoln Ave., Pittsburgh, Pa., CA $1,642,000, 1 story, 614 x 385 ft., wing, steel frame, Canon McMillan JUNIOR HIGH SCHOOL, CANONSBURG, PA. Greater Canonsburg School Auth., Connonsburg, Pa. CD 10/17, under LB.

▲ **Franklin Development Co.**, 1400 Silverside Rd., Wilmington, Del., Separate Contract $1,000,000. RESIDENT DEVELOPMENT, CLAYMONT (P. O. NEW CASTLE), DEL.

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

November 20 Virginia November 22 Kentucky
November 27 Tennessee

STREETS AND ROADS

November 20 Florida, Virginia November 22 Kentucky
November 27 Tennessee

BUILDINGS—BA

▲ **Ga., Augusta**—HOUSING—BA 11/26—Augusta Housing Auth., 2100 Broad St., low-rent housing GA 1-6, incl. 275 dwelling units. Plans deposit $50. Eve & Stulb, Masonic Bldg., and Kuhlke & Wade, 16 Campbell Bldg., archts. CD 9/18/56.

▲ **Tenn., Knoxville**—ANIMAL SCIENCE—BA 12/3—University of Tennessee, Knoxville, 3 story, T shaped 88,000 sq. ft. floor space and 22,000 seat arena for cattle judging, animal science bldg. $1,000,000. CD 6/25/53.

HEAVY CONSTRUCTION—LB & CA

▲ **Arthur Pew Constr. Co.**, Box 8, Northside Branch P. O., Atlanta, Ga., LB $3,079,948, Contr. No. 1, water treatment plant, ATLANTA, GA. Ernest J. Brewer, city purch. agt., City Hall, Zone 3, Atlanta, Ga., Bids Oct. 28. CD 9/23;
Burford, Hall & Smith, Box 1339, Atlanta, Ga. LB $1,759,613, Contr. Nos. 2 and 3, water treatment plant (Atlanta, Ga.);
R. D. Cole Mfg., Box 576, Newman, Ga., LB $74,440 Contr. No. 4 water treatment plant, (Atlanta, Ga.).

▲ **Diversified Builders**, 1616 S. Greenwood Ave., Montebello, Calif., LB $2,147,400 (5 bidders) Phase 3, equipment installation, WEST PALM BEACH, FLA. Air Products, Inc., 949 Hamilton St., Allentown, Pa. Bids Oct. 31. CD 10/23.

BUILDINGS—LB & CA

Mathis Constr. Co., Box 1106, Athens, Ga., LB $911,466, low-rent HOUSING, ATHENS, GA. Athens Housing Auth., Social Bldg., Broad St., Athens, Ga. Bids Oct. 29. CD 10/7.

▲ **C. C. Robertson Co.**, Box 169, Colbert, Ga. LB $1,194,000 Ga. Proj. Ga. No. 200, WAYNE COUNTY MEMORIAL HOSPITAL, JESUP, GA. Wayne Co. Hospital Auth., Court House Jesup, Ga. Bids Oct. 29. CD 10/1.

▲ **Clutter Constr. Corp.**, 377 Wetward Dr., Miami Springs, Fla., CA $1,160,700 STRANAHAN HIGH SCHOOL, (1957 addns.) 1800 SW 5th Place, FORT LAUDERDALE, FLA. County Bd. P. Instruction Supt. Office 1320 SW 4th St., Fort Lauderdale, Fla. Bids Oct. 24, awarded Oct. 30. CD 11/4, under LB.

▲ **Robert L. Turchin, Inc.**, 1835 Purdy Ave., Miami Beach, Fla., CA $1,000,000, 2 story, 135 x 210 ft. CB-S irreg. shaped SHOPPING CENTER, 17002 Collins Ave., MIAMI BEACH, FLA. Sirkin Family, 1 Lincoln Rd., Miami Beach, Fla. Melvin Grossman, 311 Lincoln Rd., Miami Beach, Fla., archt. J. E. Cirley & Assocs., 238 Plaza Bldg., Miami, Fla., mech.-archt. D. E. Britt Assocs., 1200 SW 1st St., Miami, Fla., struct. archts.

▲ **General Shale Corp.**, 1740 Riverside Dr. S. E., Knoxville, Tenn., Separate Contracts, Approx. $1,000,000. TUNNEL KILN for Coral Ridge Brick Plant, FAIRDALE, KY. CD 10/11, under Ky., Coral Ridge.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

STREETS AND ROADS

November 20 Michigan

▲ **ILLINOIS**—BA 11/21—Illinois State Toll Hy. Comn., 40 N. Wacker Dr., Chicago,
Cook, DuPage, Kane, Lake and Winnebago Counties—8 maintenance bldgs., Contr. No. MA-1 & MA-2, 4 on Tri-State Tollway 3 on N. Ill. Tollway and 1 on E-W Tollway, $1,900,000. Lankton-Ziegele-Terry & Assocs., 1100 Main St., Peoria, archts. CD 1/10.

BUILDINGS—BA

▲ **O., Cleveland Heights**—APARTMENTS—BA 11/25—Metropolitan Builders, Inc., 2623 Milton Rd., University Heights, (selected list of bidders), 6 apartment houses to contain 100-suites, Rugby St. and Brookline Blvd., $1,250,000-$1,400,000. Milo S. Holdstein, 1030 Euclid Ave., Cleveland, Zone 15, archts. CD 8/27.

▲ **O., Ironton**—SCHOOLS—BA 11/30—Rock Hill Bd. Educ., Ironton, 2 schools, $1,028,000. C. M. Donaldson, 45 National Bank Bldg., Portsmouth, archt. CD 11/19/56.

▲ **O., Cleveland**—MEDICAL, SURGICAL—BA 12/3—Ohio Dpt. P. Wks., Ohio Depts. Bldg., Columbus, 100-bed medical-surgical bldg. at Cleveland State Hospital. $1,000,000. Plans deposit $25. Dalton & Dalton Associates, 979 The Arcade, Zone 14, archts. CD 3/22/56.

BUILDINGS—SLC

▲ **Mich., Flint**—AUDITORIUM—Industrial Mutual Assn., Hubert L. Curtis, pres., 551 James P. Cole Bldg., soon lets contract auditorium, incl. offices, veterans service department, stores and warehouse space, meeting rooms. $1,500,000. Smith, Hinchman & Grylls Assoc., Inc., 800 Marquette Bldg., Detroit, archt. CD 11/4.

HEAVY CONSTRUCTION—LB & CA

▲ **OHIO**—Dpt. Hys., Columbus, Zone 15,
O.—D. R. Smalley & Co., Celina, O. CA $2,940,165. c. conc. 6.295 mi. incl. substructure County Rd. 34 over State Rte. 1, continuous steel girder bridge State Rte. 521 over State Rte. 1, continuous steel girder bridge County Rte. 65 over State Rte. 1, State Proj 541, Delaware Co.;
O.—Launder & Son, Inc., Glendale Ave., Toledo, O. CA $3,068,072. c. conc. 6.523 mi., incl. continuous steel girder bridge over State Rte. 1, Montgomery Twp. Rd. 207, Br. No. ASD-1-0846 continuous steel beam bridge over State Rte. 1, Montgomery Twp. Rd. 153 continuous steel beam bridge over Katotawa Creek, Montgomery Twp. Rd. 153, continuous steel beam bridge over Katotwa Creek Rte. 1, continuous steel beam bridge over State Rte. No. 1, Ashland Co. Rd. No. 46, continuous steel beam bridge over State Rte. 1, State Rte. No. 89, continuous steel beam bridge over State Rte. No. 1, Perry Twp. Rd. 47, continuous steel girder bridge over State Rte. 1, Perry Twp., Rd. 203, Fed. State Proj. 530, Ashland Co. Grand total $6,008,237. Bids Oct. 15. CD 10/23, under LB.

▲ **OHIO**—Dpt. Hys., Columbus. Bids opened 10/29,
S. J. Groves Constr. Co., Wesley Temple Bldg., Minneapolis, Minn. LB $2,779,876. 4.4 mi. Cincinnati-Conneaut freeway, fourth link in the freeway, Ashtabult and Lake Counties, OHIO. CD 10/16.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldg., Springfield,
Robert R. Anderson, 4550 W. Patterson Ave., Chicago, Ill. CA $1,181,960, 3 span and 2 span grade separation at Harlem Ave. and Congress Expressway in Chicago, Cook Co. Bids Oct. 8. CD 10/11, under LB.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Springfield, Bids opened 11/1,
H. H. Hall Constr. Co., 211 S. 15 St., East St. Louis, Ill. LB $2,623,682 (1 bidder), 19 span steel grade separation FA 1-7 at East St. Louis, St. Clair Co. CD 10/25.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldg., Div. Hys., Centennial Bldg., Springfield, Bids opened 11/1,
Ill.—Robert A. Black, Inc., 13912 S. Halsted St., Chicago, Ill. LB $542,951. (3 bidders), concrete wid'n. 12.33 mi. Ill. 92, Yorktown to Walnut, Bureau Co.; LB $85,180, (6 bidders), wid'n. 5.27 mi. Ill. 121 between Mt. Pulaski and Latham, Logan Co.;
Ill.—Ninora Constr. Co., 139 E. Van Buren St., Joliet, Ill., LB $164,440, (5 bidders), b. conc. resurf. 6.97 mi. Ill. 121 between Lincoln and Mt. Pulaski, Logan Co.; LB $128,998, (5 bidders), resurf. 5.27 mi. Ill. 121, Mt. Pulaski to Latham, Logan Co.;
Ill.—Santucci Constr. Co., 5025 Church St., Skokie, Ill., LB $1,846,890, (2 bidders), 5.65 mi. storm sewer in 95 St. near Evergreen Park, Cook Co.; LB $173,474, (2 bidders), sewer and main reconstruction in Harrison St. in Oak Park, Cook Co.;
Ill.—Triangle Constr. Co., 480 N. Evergreen St., Kankakee, Ill., LB $510,013, (2 bidders), bit. paving Rte. 150 in Cairo, Alexander Co.; LB $490,362, (2 bidders), paving, resurf. FA 185 north of Mt. Vernon, Jefferson Co.;
Ill.—Azzarelli Constr. Co., RR 1, Kankakee, Ill. LB $131,489. (3 bidders), surf. treatment 4.28 mi. FAS 1302, south of Aroma Park, Kankakee Co.;
Ill.—Burlington Roadbuilders, Carthage, Ill. LB $147,792. (2 bidders), bit. surf. 6.21 mi. FAS 423, Powellton to Adrian, Hancock Co.;
Ill.—Jesse H. Freeman, Inc., 1608 Fifth Ave., Moline, Ill. LB $293,876. (11 bidders), resurf. 13.23 mi. Ill. 92, Yorktown to Walnut, Bureau Co.;
Ill.—J. P. Hollerich Co., P.O. 214, LaSalle, Ill. LB $152,960. (4 bidders), b. conc. resurf. Ill. 92 in Walnut, Bureau Co.;
Ill.—McCalman Constr. Co., Danville, Ill. LB $400,791. (4 bidders), c. conc. paving 3.6 mi. Ill. 49 in Allerton, Vermilion Co.;
Ill.—Maclair Asphalt Co., 6000 Collinsville Rd., East St. Louis, Ill. LB $731,510. (2 bidders), resurf. 2.66 mi. FA 4 in and south of Hartford, Madison Co.;
Ill.—E. M. Melahn Constr. Co., C & NW Right of Way, Algonquin, Ill. LB $269,607. (4 bidders), wid'n. 1.55 mi. SB1-60 on Rand Rd., Lake and Cook Counties;
Ill.—W. L. Miller Co., Elvaston, Ill. LB $112,579. (3 bidders), bit. surf. 5.31 mi. U. S. 67 at Preemption west and north, Mercer Co.;
Ill.—Parro Constr. Corp., 604 W. John St., Champaign, Ill. LB $154,271. (6 bidders), wid'n. 6.6 mi. Ill. 121 between Lincoln and Mt. Pulaski, Logan Co.;
Ill.—Sangamo Constr. Co., 700 N. MacArthur St., Springfield, Ill. LB $126,498. (2 bidders), bit. surf. 4.46 mi. FAS 575 from Oakford northeast, Menard Co.;
Ill.—Leon B. Stilley Co., Marion, Ill. LB $109,519 (2 bidders), surf. treatment 2.02 mi FAS 937, Hillerman to Pulaski Co. line, Massac Co.;

Ill.—**Earl Walker & Co.**, Sullivan, Ill. LB **$97,774.** bit. surf. treatment 4.68 FAS 557 north of Beason, Logan Co.;

Ill.—**Wood Electrical Constr. Co.**, 2326 W. Ogden Ave., Chicago, Ill. LB **$102,674.** (3 bidders), furnish, install 11 traffic control signals in an near Chicago, Cook Co. CD 10/25.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Springfield, Bids opened 11/1,

Ill.—**Arcole Midwest Corp.**, 3225 Main St., Evanston, Ill., LB **$1,478,383** (9 bidders), 3 span WF grade separation N.W. Expressway and Western Ave., Chicago, Cook Co.; LB **$411,737** (8 bidders), WF beam grade separation and other work on FA 1-2 on N.W. Expressway, Cook Co.; LB **$340,726** (7 bidders), 10 span WF grade separation FA 192 in Montgomery, Kane Co.; LB **$106,498** (5 bidders), 3 span grade separation FA 192 near Montgomery, Kendall Co.;

Ill.—**E. H. Swenson & Son**, 14 Henderson Ave., Joliet, Ill., LB **$149,212** (2 bidders), 4 span I-beam grade separation FA 1-3 and U.S. 66 intersection near Plainfield on Naperville Rd., Will Co.; LB **$148,036** (4 bidders), grade separation FA 1-3 and 66 U.S. on Plainfield Rd., Will Co.;

Ill.—**Robert R. Anderson Co.**, 4550 W. Patterson St., Chicago, Ill., LB **$1,190,361** (4 bidders), WF beam grade separation East Ave. inter Congress Expressway, Cook Co.;

Ill.—**Eric Bolander Co.**, Winchester Rd., Libertyville, Ill., LB **$349,559** (3 bidders), steel WF beam railroad grade separation Ill. 120 W. of Waukegan, Lake Co.;

Ill.—**Illinois Steel Bridge Co.**, Jacksonville, Ill., LB **$139,798** (6 bidders), furnish, deliver steel for 4 span deck bridge on U.S. 24 at Ripley, Brown and Schuyler Counties;

Ill.—**Jansen & Schaefer**, 1500 Broadway, Pekin, Ill., LB **$196,484** (3 bidders), 3 span cantilever truss grade separation F.A. 1-5 intersection in E. Peoria, Tazewell Co.;

Ill.—**Keno Constr. Co., Inc.**, P. O. Box 37, Highland Park, Ill., LB **$543,178** (1 bidder), comb. 2 sections on Ill. 120 N. and W. of Waukegan, Lake Co.;

Ill.—**H. H. Mass Constr. Co.**, Main St., Algonquin, Ill., LB **$330,335** (4 bidders), 7 span cantilever steel bridge F.A. 192 So. of Montgomery, Kendall Co.;

Ill.—**M. J. McDermott & Co.**, 30 N. LaSalle St., Chicago, Ill., LB **$557,734** (4 bidders), WF beam grade separation on F.A. 1-1 Ridgeland Ave. and Congress Expressway, Cook Co.;

Ill.—**E. M. Melahn Constr. Co.**, C & NW Right of Way, Algonquin, Ill., LB **$181,834** (3 bidders), 4 span steel grade separation Ill. 120 No. of Waukegan, Lake Co.;

Ill.—**Mississippi Valley Structural Co.**, 2100 E. Eldorado St., Decatur, Ill., LB **$154,896** (10 bidders), steel for 2 parallel 7 span WF beam bridges on F.A. 1-7, S.W. Effingham, Effingham Co.;

Ill.—**Jos. T. Ryerson & Son**, 2558 W. 16 St., Chicago, Ill., LB **$220,768** (4 bidders), steel for 10 span bridge F.A. 192, in Montgomery, Kane Co.;

Ill.—**Vincennes Steel**, Oliphant Dr., Vincennes, Ind., LB **$183,631** (8 bidders), furnish, deliver steel for girder bridge SB1-150 No. of Aldridge, Jackson and Union Counties. CD 10/25.

BUILDINGS—LB & CA

▲ **Maxon Constr. Co.**, 131 N. Ludlow St., Dayton, O. CA Est. **$3,750,000.** 12 story addn. to TALBOTT TOWER BLDG., DAYTON, O. Talbott Corp., 131 N. Ludlow St., Dayton, O. CD 2/5.

▲ **Ridgmore Corp.**, 125 W. Hubbard St., Chicago, Ill., CA **$1,200,000,** 15 story, 78 unit APARTMENT, 5401 S. Hyde Park Blvd.; CA **$1,600,000,** 5 story brick, glass, 2 APARTMENT BLDGS., with large connecting base, Ridge between Farwell and Morse Ave., CHICAGO, ILL. Trust Agreement, c/o Nathan Dvorson, 127 W. Hubbard St., Chicago, Ill. Trevelyan & Trevelyan, Inc., 125 W. Hubbard St., Chicago, Ill., archt.

▲ **C. A. Tharnstrom Co.**, 7401 N. St. Louis Ave., Chicago, Ill. CA **$4,400,000.** 268 unit APPARTMENT, 5157 Sheridan Rd., CHICAGO, ILL. Ben & Sol Vollen, 33 N. LaSalle St., Chicago, Ill. Irving Karlin, 203 N. Wabash Ave., Chicago, Ill., archt. CD 1/22.

▲ **Campbell-Lowrie-Lautermilch Corp.**, 400 W. Madison St., Chicago, Ill., CA **$1,000,000** (1st unit) 1 and 2 story, 85,000 sq. ft. FACTORY and OFFICE BLDG. with parking area, Washington St. and Green Bay Rd., WAUKEGAN, ILL. Pioneer Saws Div., Outboard Marine Corp., 323 S. Servis Ave., Waukegan, Ill. Ralph E. Stoetzel, 105 W. Monroe St., Chicago, Ill., archt. CD 8/13.

▲ **Power Constr. Co.**, 125 S. Marion St., Oak Park, Ill., LB **$4,173,429,** HIGH SCHOOL BLDG., ACADEMIC WING and AUDITORIUM, W. side near Weiss Field, WAUKEGAN, ILL. Waukegan Twp. School Dist. 119, 1011 Washington St., Waukegan, Ill. Ganster & Hennighausen, 222 Washington St., Waukegan, Ill., archts. Bids Oct. 15. CD 9/24.

WEST OF MISSISSIPPI

BUILDINGS—BA

▲ **Kan., Wichita**—ACTIVITIES CENTER—BA 1/15—University of Wichita, Bd. Regents, Wichita, 2 story, bsmnt., 75x600 ft. rein.-con., brick, stone, steel, etc., Campus Activities Center (Students Union Bldg.) Yale Ave. east of Jardine Hall. $1,693,000. Uel C. Ramey & Assocs., 830 N. Main St., archts. CD 2/14.

▲ **Colo., Colorado Springs**—SCHOOL—BA 2/5—School Dist. No. 11, 406 N. Weber St., Northeast High School Bldg., incl. 73 teaching stations; cafeteria, auditorium, two gyms, swimming pool. $3,500,000. Phillips-Carter-Osborn, 2nd Floor Insurance Bldg., Denver, engrs. Edward L. Bunts & F. Lamar Kelsey, and John E. Bunts, 21 E. Monument St., archts. CD 1/2.

▲ **Colo., Colorado Springs**—SCHOOL—BA 3/12—School Dist. No. 11, 406 N. Weber St., Junior High School, Van Buren and Templeton Gap Rd. $1,075,000. Lusk & Wallace, 722 N. Tejon, engrs.-archts. CD 1/24.

HEAVY CONSTRUCTION—LB & CA

▲ **Boyd Callan, Inc.**, P. O. Box 3146, Waco, Tex., CA **$1,263,700** channel imprvs. Unit I San Antonio River San Antonio Channel Imprvt., San Antonio River and tributaries, San Antonio, ENG-41-443-58-4, TEXAS. U. S. Eng., P. O. Box 1600, Fort Worth, Tex. Bids Oct. 22, awarded Oct. 25. CD 10/24, under LB.

▲ **Texala Constr. Co.**, 8120 Stedman St., Houston, Tex., LB **$1,109,645** North West water mains, from San Felipe and Post Oak Rds. to Nicholson and 20th Sts. and from Nicholson and 27th Sts. to Fulton St. and Sylvester Rd., HOUSTON, TEX. City, City Hall, Houston, Tex. Bids Oct. 30. CD 10/21.

BUILDINGS—LB & CA

▲† **Metropolitan Paving Co.**, 300 S. Indiana St., Oklahoma City, Okla., LB **$4,341,000.** 268-unit Capehart HOUSING at Tinker Field, OKLAHOMA CITY, OKLA. Div. Procurement, Tinker Field, Oklahoma City, Okla. Bids Oct. 30. CD 10/9.

▲ **Tulsa Rig & Reel**, Philtower Bldg., Tulsa, Okla., LB **$2,322,295,** RAYMOND McCLAIN HIGH SCHOOL, 4800 N. Peoria St., TULSA, OKLA. Bd. Educ., 410 S. Cincinnati St., Tulsa, Okla. Bids Oct. 29. CD 10/9.

▲ **Natkin & Co.**, 6610 Supply Row, Houston, Tex., CA **$1,058,000** POWER PLANT exten., contr. 48, 49 and 50, AUSTIN, TEX. City, City Hall, Austin, Tex. Bids Oct. 15. CD 10/21, under LB.

▲ **Al C. Dyer**, c/o Lone Star Gas Co. Bldg., Dallas, Tex., CA **$1,267,950;** OFFICE BLDG. DALLAS, TEX. C. A. Sammons, Akard and Wood Sts., Dallas, Tex. Bids Oct. 22. CD 10/10.

▲ **Noser Constr. Co.**, Box 871, McAllen, Tex., LB est. $1,000,000. Luxury HOTEL-MOTEL, EDINBURG, TEX. Edinburg Community Hotel Corp., c/o Joe Davis, pres., Edinburg, Tex. Bids Oct. 29. CD 10/22.

▲ **Henger Constr. Co.**, 1600 Simons Bldg., Dallas, Tex., CA Total Est. **$5,500,000,** 9 story, brick, tile, concrete, steel EDISON BLDG., 10th between Houston and Throckmorton, FORT WORTH, TEX. Southwestern Bell Telephone Co., c/o Joe Chowning, div. mgr., 308 Akar St., Dallas, Tex. Bids Oct. 24. CD 10/9.

▲† **Purch. & Contg.**, Office Box 999, Laredo Air Force Base, Laredo, Tex., rejected bids Aug. 12, 345 FAMILY HOUSING UNITS at Laredo Air Force Base, Inv. 41-641-58-1, LAREDO, TEX. LB **$4,998,000.** CD 8/15, under LB.

▲ **Tidmore Constr. Co.**, 2221 34th St., Lubbock, Tex., CA Approx. **$2,750,000.** 250,000-300,000 sq. ft., Monterey SHOPPING CENTER, Main Bldg., LUBBOCK, TEX. A. M. Leftwich, Jr., J. R. Leftwich and K. D. Leftwich, 1311 Ave. H., Lubbock, Tex. Hugh Dryer, Jr. & Assocs., 1902 Ave. M., Lubbock, Tex., proj. archts.

▲ **W. R. Grimshaw Co.**, c/o Michael Bldg., Odessa, Tex., LB **$1,567,189,** HOSPITAL MEDICAL CENTER addn., ODESSA, TEX. Medical Center Hospital Ector County, c/o Comrs. Court, Odessa, Tex. Bids Oct. 31. CD 10/11.

FAR WEST

BUILDINGS—BA

▲ **Calif., Saratoga**—PLANT—BA 11/27—Paul Masson Vine Yards, 1256 Market St., San Francisco, winery on 17 acre site off Saratoga Ave., incl. 2 bldgs., one 11,000 sq. ft. reception room and wine tasting hall, other 121,600 sq. ft. bldg. for processing wines. $2,000,000. John S. Bolles, A1A, Pier 5, San Francisco, archt. CD 10/30.

▲† **Ariz., Phoenix**—HOUSING—BA On Or About 12/18—Base Procurement Office, Luke Air Force Base, Glendale, armed services housing, consisting of 725 family-housing units at Luke Air Force Base, Inv. No. 02-604-58-10. Plans deposit $300. CD 2/20/56, under Commercial Bldgs.

HEAVY CONSTRUCTION—LB & CA

▲ **CALIFORNIA**—State Div. Hys., 1120 N. St., Sacramento,

Matich, Sundt & Bevanda, P.O. Box 390, Colton, Calif., CA **$2,328,523** grading, surf. 8.6 mi. U.S. 91 between 27th St. in San Bernardino and Devore, and constr. 6 bridges to provide 4 lane freeway, San Bernardino Co. Bids Oct. 17, awarded Oct. 30. CD 10/22, under LB.

▲† **The Granite Constr. Co.**, P. O. Box 900, Watsonville, Calif. CA **$3,861,295,** est. $3,609,598, flood control proj., levee constr. on San Lorenzo River and Branciforte Creek in Santa Cruz Co., ENG-58-1, CALIFORNIA. U. S. Eng., 180 New Montgomery St., San Francisco, Calif. Bids Oct. 24, awarded Oct. 30. CD 10/23, under LB.

▲ **Vinnell Co., Inc. & Ukropina, Polich-Kral** 1145 Westminster Ave., Alhambra, Calif. (joint venture), CA **$2,483,808,** Storm Drain Bond Issue Proj. 16, Cerritos-Maplewood Storm Drain, LOS ANGELES, CALIF. Los Angeles Co. Flood Control Dist., 12250 Alcazar St.; Los Angeles, Calif. Bids Oct. 18, awarded Nov. 1. CD 10/24, under LB.

BUILDINGS—LB & CA

▲† **Larsen Constr. & Engr. Co.**, 2667 Lincoln Ave., Ogden, Utah. CA **$1,369,457,** general purpose bldg. controls laboratory, systems acceptance facility at Marquardt Jet LABORATORY, Spec. MJJ 500-3, for Dpt. Air Force, OGDEN, UTAH. Marquardt Aircraft Co., 7735 Kester St., Van Nuys, Calif. Bids Oct. 10. CD 10/22, under LB.

▲ **Le Mount Corp.**, 891 W. Whittier, La Habra, Calif. CA **$1,149,900,** 106 frame, stucco DWELLINGS in Tract 3112, LA HABRA, CALIF. J. & I.S., Inc., 891 W. Whittier Blvd., La Habra, Calif.

▲ **Watner & Fremer**, 5542 Cahuenga Blvd., North Hollywood, Calif. LB **$1,579,459** (5 bidders) Los Angeles City College addns. incl. WOMENS PHYSICAL EDUCATION BLDG. and CALLAS ROOM BLDG., LOS ANGELES, CALIF. Los Angeles Bd. Educ., 1425 S. San Pedro St., Los Angeles, Calif. Bids Nov. 1. CD 10/15.

▲ **Soule Steel**, 1750 Army St., San Francisco, Calif., CA **$2,000,000,** expansion of Kaiser Steel Fabricating PLANT, consisting 50,000 sq. ft. bldg., misc. bldgs., storage, etc., NAPA, CALIF. Kaiser Steel Corp., 1924 Broadway, Oakland, Calif.

▲† **Robert E. McKee, General Contractor, Inc.**, P. O. Box 350, Glendale, Calif. CA **$19,877,500,** VETERANS HOSPITAL BLDG. and facilities, 90 acre site, Spec. 5730, PALO ALTO, CALIF. Veterans Admin., Office of Dir. Constr., Munitions Bldg., Wash., D. C. Bids Oct. 22, awarded Nov. 1. CD 10/24, under LB.

▲ **E. A. Hathaway**, 1098 S. 5th St., San Jose, Calif. CA **$1,093,201,** Andrew P. Hill HIGH SCHOOL addns. in San Jose and Samuel Ayer HIGH SCHOOL in Milpitas, SAN JOSE, CALIF. East Side Union High School Dist., 57 North White Rd., San Jose, Calif, Calif. CD 11/6, under LB.

▲ **Paul Wright & Ben Oretsky**, P. O. Box 2185, Santa Rosa, Calif. CA **$1,630,000** joint venture. Montgomery HIGH SCHOOL, SANTA ROSA, CALIF. Santa Rosa City School Dist., c/o Supt., 211 Ridgeway, Santa Rosa, Calif. Bids Oct. 29. CD 11/6, under LB.

CANADA

BUILDINGS—BA

▲ **Ont., Delaware**—SEMINARY—BA 11/18—Priests of the Sacred Heart, Very Rev. P. Renders, 150 King St., London, 2 story, T-shape, structural steel frame, brick and block walls dormitory, kitchen, chapel and gymtorium, $2,000,000, Blackwell & Hagarty, 310 Princess Ave., London, archts. M. M. Dillon & Co. Ltd., 141 Maple St., London, engrs. CD 3/2/56.

▲ **Ont., Toronto**—OFFICE—BA 11/22—New York Life Insurance Co., 320 Bay St., 5 story, 98 x 114 ft., exterior aluminum glass and masonry constr. office bldg. with 3 underground parking levels and 38,000 sq. ft. rentable office space, University Ave. and Dundas St. W. $1,400,000. Gordon S. Adamson & Assocs., 52 St. Clair Ave. E., archts Wallace Carruthers & Assocs., Ltd., 92 Yorkville Ave., engrs. CD 8/30.

BUILDINGS—SLC

▲ **Ont., Toronto**—OFFICE—Union Carbide Canada Ltd., 2221 Yonge St., soon lets contract substructure incl. excavations, fdns., mechanical work and partial waterproofing, 15 to 20 story, 300 ft. frontage, office bldg., parking facilities for 200 cars, Eglinton Ave. E. Total est. $6,000,000. Shore & Moffat, 51 Eglinton St. W., archts. Charles Leopold, 213 S. Broad St., Phila., Pa., engr. CD 10/9/56.

HEAVY CONSTRUCTION—LB & CA

▲ **McNamara Constr. Co. Ltd.**, 42 Industrial Rd., Leaside, Ont., CA **$2,108,400,** dredging Toronto Harbor incl. dredging an approach channel 300 ft. wide from eastern gap to Yonge St., 180,000 cu. yd. rock and 330,000 cu. yd. loose material must be removed from channel to bring it to seaway depth of 27 ft. TORONTO, ONT. Dpt. P. Wks., Hunter Bldgs., Ottawa, Ont. Awarded Oct. 25. CD 10/8.

▲ **QUEBEC**—Province of Quebec, Parliament Bldgs., Quebec City,

George Gagne Ltee., 190 Cremazie Blvd. E., Montreal, Que., CA approx. $1,500,000, bridge over Riviere Jacques Cartier, on Quebec-Montreal Hy. at Donnacona, Awarded Oct. 28. CD 11/29.

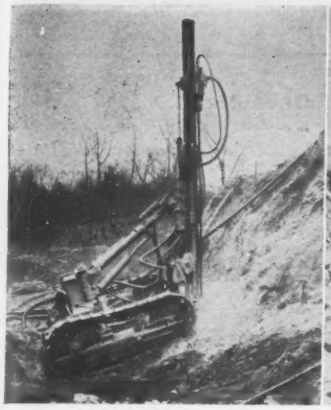
BUILDINGS—LB & CA

▲ **Central Mortgage & Housing Corp.**, 40 Eglinton Ave. E., Toronto, Ont., cancelled bids to have been opened July 2, constr. 160 housing units and ground service at ARMY CAMP, CAMP BORDEN, ONT. Over $1,000,000. Project cancelled. CD 6/14.

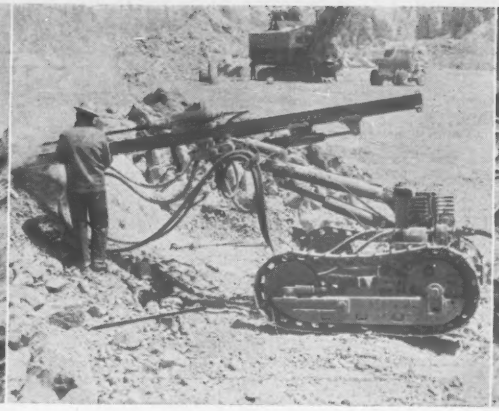
▲ **Turrent Constr. & Housing Co. Ltd.**, 5752 Park Ave., Montreal, Que., CA Est. **$1,000,000,** six 3 story, bsmnt., brick-encased constr. flat tar and gravel roof APARTMENT BLOCKS, concrete fdn., Favard St., MONTREAL, QUE. Tower Holdings Ltd., 5752 Park Ave., Montreal, Que. Awarded Oct. 28.

▲ **Francois Marquis & Fils Ltee.**, 169 West rue Cremazie, Quebec City, Que., CA Est. **$1,000,000,** 7 story, 86 x 268 ft. HOSPITAL addn. at St. Francois D'Assisi Hospital, Leclerc St., QUEBEC CITY, QUE. Rev. Soeurs de St. Francois D'Assisi, 1605 First Ave., Quebec City, Que. Pierre Rinfret, 1134 Chemin St. Louis, Sillery, Que., archt. Awarded Oct. 21.

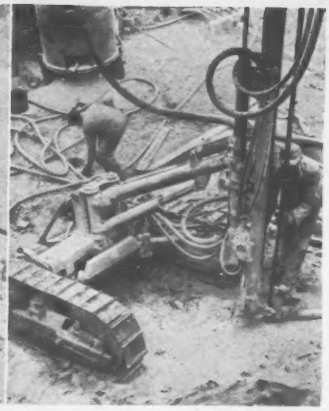
(Proposal Advertisement see pp. 157 to 160)



There is no fussing with time consuming hoists and wire rope to spot this drill.



The big savings are in speed of set-ups and maneuverability. Set-up time is not production time.



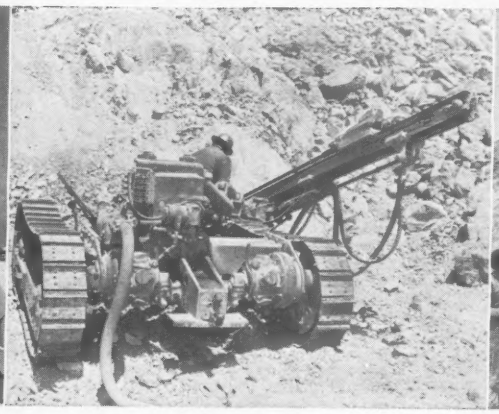
Convenient controls, reverse and release rotation make for fast and easy steel changes.

the NEW Ingersoll-Rand CRAWL-IR MOST FULLY MECHANIZED CRAWLER DRILL EVER DEVELOPED

No other crawler drill is so fully powered — so fast and easy to setup — so safe and convenient to use. It will drill horizontally, vertically, or at any angle, with all boom and tower motions controlled hydraulically at the touch of a throttle.

The CRAWL-IR tows its own air power up slopes or over rough terrain. Heavy duty air motors propel the rugged knee-action crawlers. Call your I-R man or write for bulletin 4189.

The CRAWL-IR is not dependent on other equipment and men to move its air power—it tows its own.



Here is a graphic example of complete flexibility—toe holes out over the side of the crawler.

Sound design, convenience of controls and rugged construction give you all you could ask for in a crawler drill.

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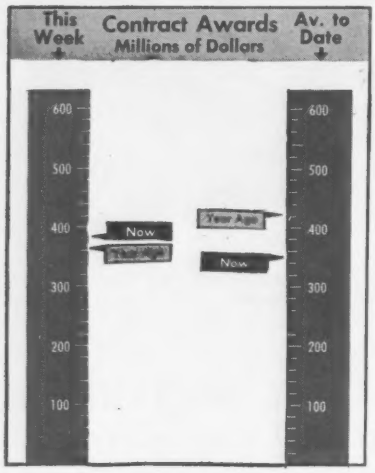
FOR A FACE-SETTING DRILLING COMBINATION, POWER THE CRAWL-IR WITH A GYRO-FLO COMPRESSOR.

Construction Scoreboard

Activity this Week



AMOUNT OF CONTRACTS LET

By Ownership	This Week	Cum. 46 wks 1957	Chge '56-'57 %
		millions	
Federal	$53.6	$2,091.4	+36
State and Municipal	166.6	6,575.6	+13
Total Public	220.2	8,667.0	+18
Total Private	152.7	7,640.9	−36
U. S. Total	$372.9	$16,307.9	−16
By Type of Work			
Waterworks	$13.5	$325.7	+2
Sewerage	12.8	492.9	−8
Bridges	23.2	643.7	+16
Highways	74.4	2,686.9	+21
Earthwork, Waterways	9.1	907.3	+37
Buildings:			
Public, Excl. Housg.	84.9	2,088.6	+13
Public Housing	...	599.9	+108
Private Housing	70.2	2,745.4	−44
Commercial	40.0	1,561.7	−8
Industrial	37.8	2,847.9	−39
Unclassified	7.0	1,407.9	−13
U. S. Total	$372.9	$16,307.9	−16

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

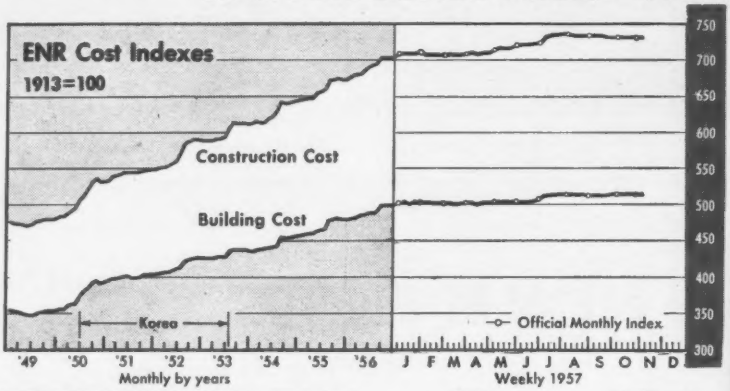
NEW CAPITAL FOR CONSTRUCTION

	Week of Nov. 7	Cum. 45 wks 1957	Chge '56-'57 %
		millions	
Corporate Securities	$15.8	$5,177.6	+22
State and Municipal:			
All Except Housing	48.9	4,823.8	+18
Housing	...	155.8	+72
Federal Loans	2.7	182.3	+36
Federal Aid	...	2,161.2	+102
Total Nonfederal	$67.4	$12,500.7	+30
Federal Appropriations:			
In U. S.	...	$2,777.0	−20
Outside U. S.	...	29.0	+82
Total New Capital	$67.4	$15,306.7	+17

Cost Indexes as of Now

ENR INDEXES (1913=100), 20-cities' average	Week of Nov. 7 1957	% Change from Oct. 10 1957	% Change from Nov. 8 1956
Construction Cost	737.21	+0.04	+4.7
Building Cost	516.59	+0.01	+3.0

To convert above indexes to 1926=100: Divide Construction Cost by 2.080; Building Cost by 1.850
1949=100: Divide Construction Cost by 4.770; Building Cost by 3.518



CONTRACTS AWARDED

	1957 Oct. (millions)	1957 10-Mos. (millions)	% Change from 1956 Oct.	% Change from 1956 10-Mos.
Total U. S., ENR reported	$1,699.9	$15,787.0	−10	−14
Private	866.6	7,410.9	−24	−35
Public	833.2	8,376.2	+13	+21
State and Municipal	703.4	6,350.3	+16	+16
Federal	129.9	2,025.9	+ 0.5	+40
ENR Volume Index, 1913=100	506	540	−31	−22

NEW CONSTRUCTION CAPITAL

Total U. S.	$1,419.2	$15,239.3	+90	+21
State and Municipal Bond Sales	627.0	4,930.7	+42	+27
Corporate Security Sales	784.3	5,161.8	+165	+27
Federal Loans, Aid (nonfederal work)	7.9	2,340.8	−6	+94
Federal Appropriations (federal work)	0	2,806.0	....	−19

* Includes funds for outside U. S.

MATERIALS SHIPMENTS

Unit	1957 July (Jl) Aug. (Ag) Sept. (S) Oct. (O)	Cum. (No. of Mos.)	Percent Change from Year Ago Mo.	Cum.
Portland Cement, Bur Mines, thous bbls	35,365(Ag)	190,089(8)	+ 6	− 8
Concrete Paving Awards, PCA, thous sq yd	4,844(S)	71,679(9)	− 8	+ 9
Fabricated Structural Steel, thous tons	295(S)	2,749(9)	+22	+17
Bookings, AISC, thous tons	194(S)	2,289(9)	−21	−23
Reinforcing Bars, Net, AISI, thous tons	182(Ag)	1,882(8)	n.a.	n.a.
Lumber, NLMA, mil fbm	2,866(S)	25 817(9)	−0.2	− 8
Orders, mil fbm	2,797(S)	25,774(9)	−3	− 7
Production, mil fbm	2,883(S)	25,763(9)	−8	−10
Douglas Fir Plywood, DFPA, 3/8" basis				
Production (average per week), mil sq ft	107.2(S)	103.1(9)	+ 4	+ 4
Orders (average per week), mil sq ft	124.0(S)	104.6(9)	+22	+12
Clay Products, Bureau of Census				
Brick, Unglazed, Common, Face, mil bri	619.3(Jl)	3,434.9(7)	+0.1	−13
Vitrified Clay Sewer Pipe, thous tons	153.7(Jl)	950.1(7)	−14	−11
Structural Tile, Unglazed, thous tons	57.9(Jl)	356.1(7)	+ 2	−10
Asphalt Products, Bureau of Census				
Asphalt Roofing, thous sales sqs	5,917(Ag)	35,735(8)	− 1	−11
Asphalt Siding, thous sales sqs	101(Ag)	671(8)	−12	−11
Aluminum, Wrought, Net, Bur Census				
Sheet and Plate (non-heat treatable), mil lbs	820(Ag)	662.8(8)	+24	−11
Wire and Cable, mil lbs	23.5(Ag)	191.0(8)	−12	− 8
Extruded Shapes (Soft alloys), mil lbs	57.0(Ag)	428.1(8)	+ 5	− 2

EMPLOYMENT AND FAILURES

Contract Const Employment, BLS, thous.	3,287(S)	3,020(9)†	− 2	+ 3
Contractor Failures, Dun & Bradstreet				
Number	176(O)	1,737(10)	− 3	+17
Liabilities, thous	$7,994(O)	$91,179(10)	−28	+12

† Average per month

How to widen streets fast

This No. 977 Traxcavator* digs concrete, asphalt and compacted earth, loads a truck every 2 minutes, grades as it goes

Vogel Construction Corp. was widening 1.6 miles of 38th Street, Indianapolis, Ind., when this picture was taken. The job included excavating 40,000 cu. yd. of old concrete, digging up front yards and driveways. Street width was increased from 40 to 80 feet. And most of the work was done by a CAT* No. 977 Traxcavator.

Hard earth, broken concrete and asphalt are tough materials to dig, but the machine's superior pry-out action resulted in full bucket loads. The main problem was keeping enough trucks under the bucket. The No. 977 was loading a truck in less than 2 minutes, and it maintained a good level grade as it dug. Vogel Construction Corp. also found the No. 977 good at skimming asphalt off of old pavement.

Caterpillar-built Traxcavators have been designed for one purpose—to increase your production and cut costs. The No. 977, largest of the line, gives you the power and performance for big road jobs. Its 100 HP engine and ample track surface back up the 2¼ cu. yd. bucket with tremendous digging force. Quick-acting hydraulic controls add to the machine's great maneuverability. It's easy to operate and has maximum job visibility.

Balanced weight distribution makes for good stability on rough terrain or steep grades. The 40-degree tilt-back of the bucket at ground level prevents spillage. And the bucket can be raised almost 12 feet for high load clearance.

Get the full story of this rugged, modern excavating tool from your Caterpillar Dealer. He'll demonstrate the No. 977's performance on your own job, and he stands behind its long, profitable work life with dependable service and parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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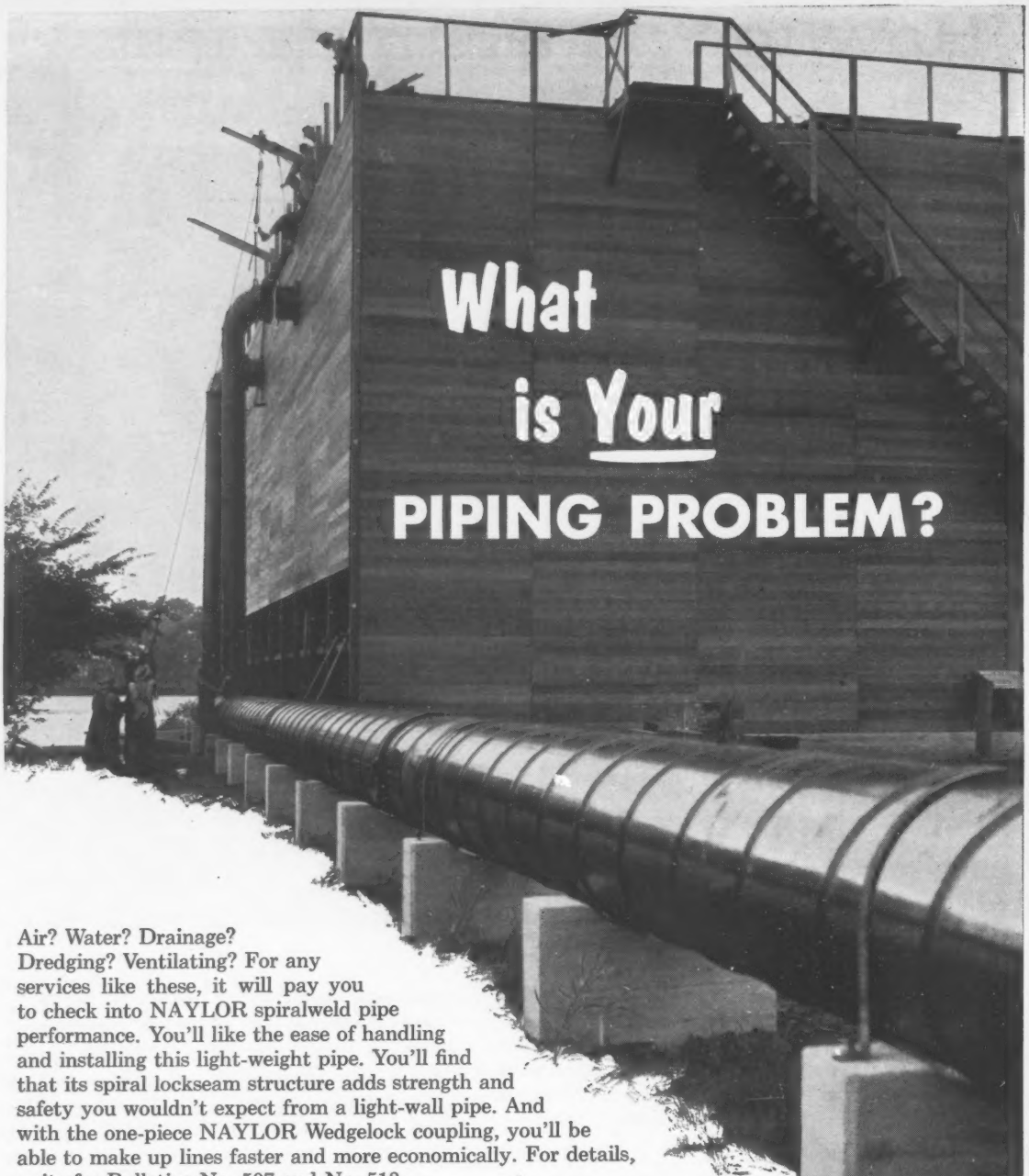
BUILT FOR THE HARD WORK



Air? Water? Drainage? Dredging? Ventilating? For any services like these, it will pay you to check into NAYLOR spiralweld pipe performance. You'll like the ease of handling and installing this light-weight pipe. You'll find that its spiral lockseam structure adds strength and safety you wouldn't expect from a light-wall pipe. And with the one-piece NAYLOR Wedgelock coupling, you'll be able to make up lines faster and more economically. For details, write for Bulletins No. 507 and No. 513.

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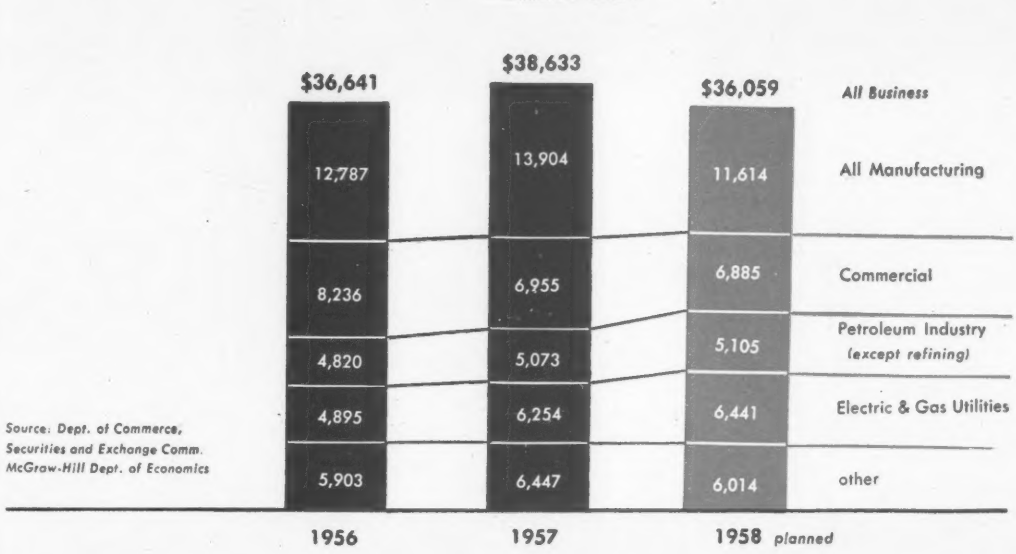
THE LONGER LOOK:

Capital Spending Plans for 1958



Cutback on Plant Outlays Due Next Year

Capital spending for new plants and equipment will be down next year, for the first time since the 1954 recession year. U. S. business firms now plan to reduce investment in new facilities by 7% from the 1957 all-time peak. In manufacturing, the cut planned for 1958 is 16%.

The drop in industrial spending for new construction and equipment—signaled by the decline in ENR's industrial contract awards this year—is reported in a new survey of Business Plans for Capital Spending in 1958 and 1959 conducted by the McGraw-Hill Department of Economics.

A few industries are moving against the tide and plan to boost spending above 1957 levels. Electric and gas utilities expect to spend 3% more, and transportation and communications (other than railroads) will spend 1% more. The petroleum industry, with a 5% rise planned for refining facilities, also is expected to spend 1% more than this year.

Commercial business firms reported to McGraw-Hill that they plan to hold spending within 1% of the 1957 total. But this follows an estimated drop of 16% below 1956.

In the commercial area, the McGraw-Hill survey sample consists mostly of large chain stores, department stores, banks and insurance companies. The smaller trade and service companies evidently are trimming their capital spending more. But it is the larger companies that account for the bulk of commercial construction.

Among manufacturing industries, only electrical machinery intends to raise plant and equipment spending much in 1958. The planned increase is 13%. On the other hand, big cuts are scheduled for textiles (down 23%), paper and pulp (24%), iron and steel (24%), autos (30%) and non-ferrous metals (38%).

• **Big spenders**—Heaviest spenders on manufacturing facilities will be the chemical industry ($1.7 billion), iron and steel ($1.4 billion) and machinery ($1 billion). The auto industry will spend less than $1 billion for the first time since 1952.

Within the major manufacturing industry groups, 1958 spending plans of companies making the following products are of special interest to construction:

Construction & mining machinery	−20%
Heating apparatus	−21%
Cement	−60%
Glass	−2%

Most companies reporting in the McGraw-Hill survey (52%) now plan to hold their capital spending at reduced levels through 1959. Further cuts are expected by 28% of the companies, while 20% plan to spend more in 1959 than in 1958. In electric utilities, where next year's increased spending will round out many expansion programs, 45% of the reporting companies expect to spend less in 1959.

Despite the broadside cutting of capital outlays, the expenditures now planned for new industrial construction and equipment in 1958 and 1959 will still be high compared with most previous years. For instance, the 1958 total is 20% more than actual spending in 1955 and only slightly under the 1956 total.

• **Too much capacity**—The main reason behind the reduction in capital spending is the sharp increase in manufacturing capacity—while sales and production have been leveling off. Earlier McGraw-

NOW...DRILL 9" HOLES WITH THE NEW JOY 59-BH CHAMPION

This world-famous pioneer rotary-air-blast-drill has adopted many of the features of its big brother, the Super-Heavyweight, to give you these advantages:

MORE STABLE DRILL STRING through use of round pipe . . . BETTER AIR CIRCULATION and cuttings removal . . . FASTER DRILLING—faster retraction of hydraulic feed averages total of only 3 minutes on a 51′ hole . . . EXTENDED 55′ MAST permits drilling 50′ hole without adding pipe . . . BETTER MOBILITY —hydraulically raised and lowered mast is left assembled during long moves . . . 9" HOLE allows wider hole spacing, economical use of large diameter powder.

This all adds up to new records in low cost per ton of rock. Get the whole story on the 59-BH. Write to ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.

Write for Bulletin 168-24

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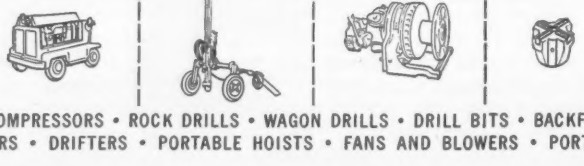

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. . . THE LONGER LOOK: Cutbacks in plant outlays due

Hill surveys have shown that, on the whole manufacturing companies prefer to operate at about 90% of capacity. In September, they reported they were actually operating at only 82% of capacity.

In face of large increases in capacity, average operating rates have been slipping. At the end of 1955, when many companies were short of capacity and working on mounting order backlogs, the average rate of operations was 92%. By the end of 1956, this had fallen to 86%. With a further drop of 4% by September, many companies have decided it's time to put on the brakes.

Operating rates still are not dangerously low in any industry group. The lowest figure reported is the average rate of 77% in transportation equipment (aircraft, ships, railroad equipment). And some industries—paper and petroleum refining—are still running as high as 90%. Still, the feeling seems to be that a slowdown on further expansion now will keep the gap between production and capacity from widening.

• **New emphasis on R&D**—Though capital spending will be down next year, and probably will not bounce back appreciably in 1959, industry is stepping up activity in an area that will yield ideas for new facilities in future years—research and development.

Fully 95% of the companies reporting to McGraw-Hill say they will spend as much or more for research and development in 1958 as they did in 1957. Of the 95%, research spending will be maintained at 1957 levels by 57% of the respondents and increased by 38%. The only industries in which a large percentage of companies expect to spend less on research are aircraft and professional and scientific industries, in both instances because of cuts in defense spending.

Companies participating in the McGraw-Hill survey were asked whether their research programs would lead to substantial expenditures on new plants and equipment in 1959 or later. "Yes" answers were given by 38% of all companies replying. High percentages answered "yes" in the chemical (65%), electrical equipment (60%) and petroleum (50%) industries.

The plans reported in the new McGraw-Hill survey are preliminary plans, subject to later review when final budgets are considered. Final plans may turn out to be higher, or lower, than the preliminary figures available in September and October when the survey was conducted. However, in the past these preliminary surveys have accurately shown the trend of capital spending.

This year's survey includes more companies than ever before. Those in the industrial sample employ a total of more than 9.4 million workers, about 44% of all industrial employment. In the industries where capital investment is highest, the proportion represented in the survey is even greater.

Present tentative plans for spending on new construction and equipment in 1958 and 1959 will be re-checked, and later plans reported in more detail, in McGraw-Hill's survey of capital spending plans next spring.

How 1958 Capital Spending Plans Shape Up

Industry	1956 Actual (millions of dollars)	1957 Estimated (millions of dollars)	1958 Planned (millions of dollars)	1957–1958 Percent Change
All Manufacturing	$12,787	$13,904	$11,614	−16%
Iron & Steel	$1,336	$1,857	$1,411	−24%
Nonferrous Metals	601	944	585	−38
Machinery	1,078	1,257	1,047	−17
Electrical Machinery	603	653	738	+13
Autos, Trucks & Parts	1,689	1,194	836	−30
Transportation Equipment	440	596	501	−16
Other Metalworking	887	866	623	−28
Chemicals	1,455	1,795	1,723	− 4
Paper & Pulp	801	847	644	−24
Rubber	201	208	193	− 7
Stone, Clay & Glass	686	604	552	− 9
Petroleum Refining	711	889	933	+ 5
Food & Beverages	799	828	749	−10
Textiles	465	397	306	−23
Miscellaneous Manufacturing	1,035	969	773	−20
Petroleum Industry	5,531	5,962	6,038	+ 1
Mining	443	460	375	−18
Railroads	1,231	1,457	1,064	−27
Other Transportation & Communications	4,229	4,530	4,575	+ 1
Electric & Gas Utilities (1)	4,895	6,254	6,441	+ 3
Commercial	8,236	6,955	6,885	− 1
ALL BUSINESS (2)	36,641	38,633	36,059	− 7

(1) Gas Utilities based on survey by American Gas Association.
(2) Petroleum Refining, included under both manufacturing and petroleum industry, is counted only once in the total.
Source: U. S. Department of Commerce, Securities and Exchange Commission, McGraw-Hill Department of Economics.

Alabama Referendum

Bonds of $22 million up for decision in December

Alabama residents will vote Dec. 17 on a proposal to issue $22 million in capital improvement and new construction bonds. The voters have also been asked to approve the boosting of allowable interest rates on $6 million of construction bonds authorized last year.

The bond proposals to be voted on include:

• A $10 million issue for construction of port facilities on the state's rivers. However, earlier legislation directs that only $3 million shall be sold if the proposal is approved. The remaining $7 million is subject to new legislative approval.

• Capital improvement bonds of $4.5 million for work at the Birmingham Medical Center. The program calls for purchase of land adjacent to the existing center and funds to match federal construction grants.

• $4.5 million for site acquisition, construction and equipping of buildings of the School of Agriculture, Agriculture Experiment Station and School of Veterinary Medicine, all at Alabama Polytechnic Institute, Auburn.

• $3 million for land, construction and equipping of buildings at Alabama Institute for the Deaf and Blind, Talladega.

The interest rate proposals would increase the allowable rate from 3% to 4½% on $4 million in construction and improvement bonds at Alabama State hospitals and Parlow State School, Tuscaloosa. A $2 million issue would have its allowable interest rate increased from 2½% to 4%. This issue was authorized for facilities at state tuberculosis hospitals. The state has had difficulty in selling these issues and it is expected that an interest rate boost will make them more attractive to investors.

(B&F continued on page 146)

Changing Outlook

Realty group meets in atmosphere of caution

An undertone of caution was subtly apparent last week when 5,000 members of the National Association of Real Estate Boards assembled at the organization's annual convention in Chicago.

The association, which represents a large number of mortgage brokers, industrial and commercial developers, appraisers and even a few homebuilders, for the last several years had convened in an atmosphere of boundless optimism. But this latest session saw many in the business pulling in their horns.

There was no deep gloom, but there was a keen awareness that the bloom was off the boom. There also was disagreement. Norman P. Mason, Federal Housing Administration commissioner, in strong terms condemned a resurgence in second and third mortgages and the various forms of land sales contracts. But some leading mortgage brokers and developers said they did not feel such financing measures were at a dangerous level.

However, Mr. Mason said that last June, second mortgages had accounted for "less than 10% of all conventional mortgage financing whereas multiple financing and land sales agreements now are accounting for 30% of conventional type home loans." He pointed out, however, that "these are not statistical figures, but an estimate based on reports from our offices across the country."

He recalled the late 1920s and early 1930s when serious "problems arose from improper financing methods and we had to bail out the banks that got back too much property. That was why FHA was born."

Mr. Mason said that secondary financing and land purchase agreements always tend to develop in periods of tight money, but he warned that although "I will not predict what Congress will do, I must point out people on some committees will be leaning to some type of direct loan program if people cannot borrow home purchase money at reasonable terms in the amount they require to buy a home."

The commissioner did reach common ground with the realtors on the point of the allowable discounts charged under the FHA-insured mortgage program. Under the present housing laws, Congress fixed the maximum discount from a mortgage at 2½% with the percentage ranging down to 1% depending on the region.

He said that such controls "won't work and I'm opposed to the philosophy under which it is set up," because it interferes with the market and influences it in an unnatural way. Mr. Mason added that "ceilings become floors and discounts appear where there were none before."

• **Interest outlook**—As to the future course of FHA home loan interest rates, Mr. Mason was deliberately vague. He pointed out that under existing law, the agency can regulate its interest rates up to 6%, "but we are not making any changes, although we are studying our figures to see if our rates need revising. However, we are always studying our figures."

He apparently knocked down the possibility of allowing lenders to charge a ½ of 1% service charge on all FHA mortgages. "We are under strong pressure to allow such a charge, but I don't feel this should be done," he said.

What could have been a strong note of optimism from the commissioner—applications for FHA mortgage insurance are near a peak—was knocked down later by the men who have a big hand in originating such applications.

They said that the great number of applications to the agency are merely a means being used by brokers to establish a price on a given property. "Most of those applications will never become a loan," one realtor emphasized.

He explained that many home owners place too high a price on their property. By applying to FHA, an appraisal is obtained which generally is lower than the original asking price.

If the owner needs his high asking price in order to meet the present cash requirements for a new house, the lower appraised value may result in a change of heart. The owner will give up the idea of a new house and stay with his old one.

The brokers also contradicted Mr. Mason's statement that lending institutions are not boycotting FHA loans. He based his conclusion on the near-peak of FHA applications.

Many brokers vehemently stated that lending institutions "are out of the FHA mortgage market entirely."

• **Varying outlooks**—But all the disagreement did not occur between government officials and the real estate men. A few violently disagreed on the outlook for mortgage money supply next year.

One, Jack Justice of Miami, Fla., said that the latter half of next year would see a generally loosening of the money supply. W. Max Moor of Denver emphatically spoke to the contrary.

Port Front Active

Three states take steps to provide new facilities

Activity on construction of port facilities continued to make news for construction men last week. It ranged from proposals for a new facility in Baltimore Harbor to a new $100 million Pittsburgh to Lake Erie canal.

• **Maryland**—Two significant actions pushed port work to the fore, as Baltimore and state officials moved rapidly in an attempt to hold the city's position as a major east coast port against threatened competition of the St. Lawrence Seaway.

The newly organized Maryland State Port Authority announced the appointment of Walter C. Boyer, now a senior design engineer for J. E. Greiner Co., as director of engineering for the authority.

Mr. Boyer, a long-time resident of Baltimore and a graduate of Johns Hopkins University in civil engineering, apparently had immediate work to do. Almost simultaneously with the announcement of his appointment, members of the Port Authority made an official tour of a little-used 350 acre airport, called Harbor Field, on the southeast side of Baltimore harbor. The site, surrounded by water on three sides, is easily accessible by railway and by truck through the new tunnel under the Patapsco River. Port Authority spokesmen said the present 20 ft channel could be deepened at a cost of about $1 million.

• **In Virginia**—In another east coast area, Army Engineers announce that work will start soon on a $5.5 million project to widen 6 miles of the Norfolk ship channel from its present 750 ft to 1,500 ft. The project—after removal of about 11 million cu yd of material—will furnish Norfolk with the second widest ship channel on the east coast.

• **In Pennsylvania**—Pennsylvania planners are working on a project to build a $100 million canal between Pittsburgh and Lake Erie, to cash in on the Seaway completion.

John P. Robin, chairman of the Pennsylvania State Planning Board, says that his agency now is conducting an engineering study of the long-discussed canal project, with the New York City engineering firm of Ford, Bacon & Davis making a study of a number of possible routes for the waterway between Lake Erie and the Ohio River.

(*B&F continued on page 148*)

These rustproof aluminum lighting standards provide unexcelled illumination for Highway 61 at Baton Rouge, Louisiana. Hubbard & Company, of Pittsburgh, Pennsylvania, fabricated the attractive bracket style "Y" lighting standards.

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San Diego Contractor Declares Bankruptcy

Rogers Construction Co., San Diego, has declared bankruptcy and defaulted on local jobs totaling almost $1.5 million. The firm's bonding company, United States Fidelity and Guarantee Co., Baltimore, will arrange to complete projects already under contract.

Defaulted in San Diego are a $999,350 boulevard widening project, a $156,314 contract for sewer construction, and a $271,000 job to build classroom additions.

According to Lawrence Hozlman, executive secretary of the San Diego Wholesale Credit Men's Association, and bankruptcy referee, the Rogers company also had contracts for an 800 seat chapel at Miramar Naval Air Base, a reservoir project in Grossmont, Calif., an Arizona state highway job at Flagstaff, and a U.S. Department of Commerce project at Grand Canyon, Colo.

The company declared voluntary bankruptcy because it didn't have funds to meet obligations, though assets were found to be in excess of liabilities.

Gardner-Denver Co. to Be Acquired by Dresser Firm

Dresser Industries, Inc., of Dallas will acquire the Gardner-Denver Co. of Quincy, Ill., if the proposal is approved by stockholders of both companies in January. Dresser manufactures equipment for the oil, gas and chemical industries. Gardner-Denver produces compressors, pumps, rock drills and air tools.

Dresser plans to combine the Gardner-Denver with four other Dresser subsidiaries and operate them as one wholly-owned subsidiary to be known as Gardner-Dresser Co.

Sales of the consolidated firms would total about $350 million yearly. The transaction will be effected through an exchange of stock.

Contract Is Terminated On Cowlitz River Dam

With payment of a final $2.2 million to Arundel-Dixon Corp., the contract for 40% completed Mayfield hydroelectric project has been terminated by Tacoma, Wash., City Light. The contractor previously had been paid $4.5 million of its $10.8 million contract.

City Light has spent more than $9 million on the Cowlitz River Dam, on which work was discontinued last March because it would flood out a state fish hatchery. The city could neither buy the hatchery nor get it condemned, forcing it to terminate the dam contract (ENR Oct. 24, p. 25).

Construction Markets

Cincinnati, Ohio: An On-the-Spot Report

Construction activity in Cincinnati, so far this year is off slightly in some sectors from last year, but the area's building industry is encouraged by the belief that the decline has halted. Volume is expected to remain at present levels well into next year, and the fact that further declines are not threatening is in itself a note for cheerfulness.

It is obvious, however, that the strength of construction in Cincinnati will be most noticeable in the field of public works. The private market has not collapsed by any means, but it is not the force that the building industry would like it to be. But, between the two—private and public—it is quite apparent that not many segments of the construction business will go hungry.

Architects and engineers report, "We are busy and we expect to stay busy." One firm specializing in commercial construction said that it has three major improvement operations beyond the talking stage. Others report activity in a similar type of work but most of the jobs are on a comparatively smaller scale. All together, however, there are enough jobs to keep a normal work force at the drawing boards for the rest of this year and most of 1958.

The high cost of financing has taken its toll and the slackening in the industrial and commercial fields is attributed to the tightness and expense of money. This has had no great effect on public work, however.

For example, one project that had been in the discussion stages for several years finally got the go-ahead signal and work is to start next month to the tune of $6 million.

And early next year, the city's Laurel-Richmond urban redevelopment project will seek brick and mortar activity. This will provide 855 new living units.

Other jobs that will come up during the next four months will add approximately $29 million to overall construction volume in the city. The larger jobs include $4 million for the Millcreek sewage works, $5 million for a water pumping station and $2 million for the Hamilton County highway.

Within two months, construction will start on $4 million worth of Nike air defense sites to be located around Cincinnati.

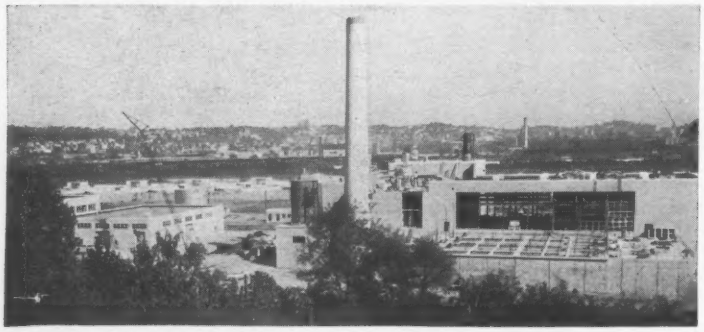
A large federal building may also enter into its early stages next year as the General Services Administration has announced that it will "go forward immediately" in selection of a site for a $21.7 million government office building.

This project probably hinges on the newly invigorated lease-purchase plan (ENR Oct. 17, p. 80), although GSA also announced that the building will be constructed, "even if a direct appropriation is needed."

School and hospital construction will amount to $30-35 million.

Private work has taken its most serious beating in the field of housing. Homebuilding is down 15-20%. Homebuilders don't expect any improvement in early 1958 and at the same time they predict higher prices for new housing.

Some large commercial construction jobs are expected to start next year. These include a $10 million office building, a $7 million research and development center for Proctor & Gamble Co. and a large expansion project for Formica Co.



LARGEST CINCINNATI JOB is now the $25 million Millcreek sewage works.

AERO *field crews make 42,000 ft. shots with Tellurometer*

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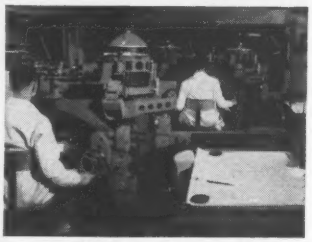
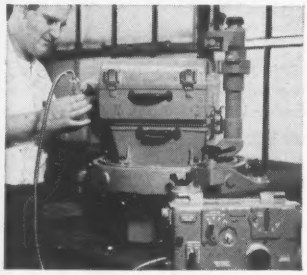


Part of AERO'S *battery of Wild stereoplotters, used for highway profiling, cross-sectioning, other precise engineering requirements.*



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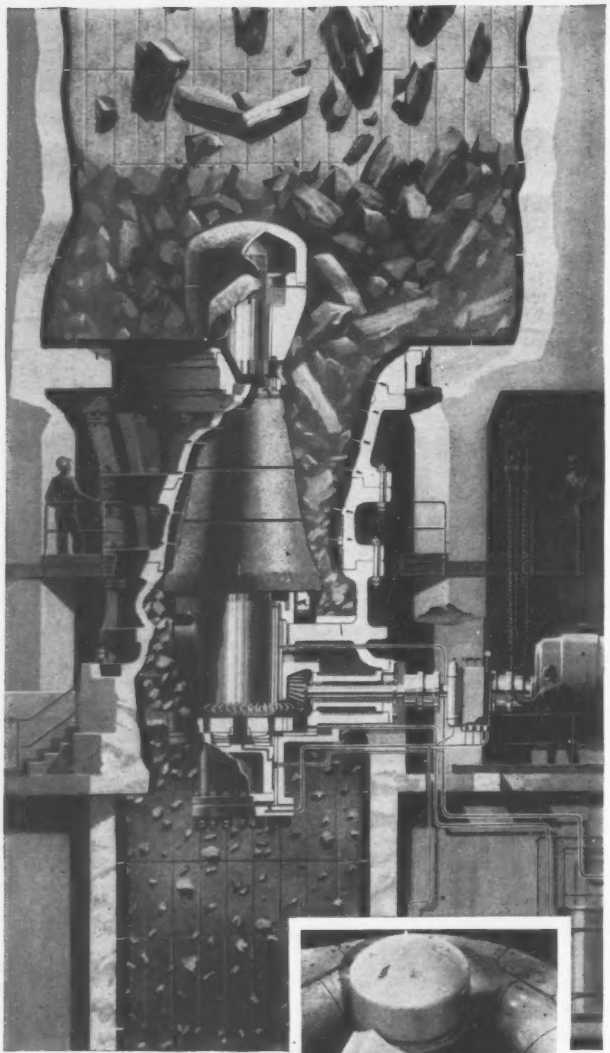

Illustration above by courtesy of Socony Mobil Oil Co., Inc.

Mantle and concaves (shaded portions) in this rock-crushing giant are cast of Amsco Manganese Steel. Mantle weighs approximately 40,000 lbs.—the concaves, or side plates, approximately 71,000 lbs.

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McClellan Scores Management

Disclosure of anti-union activity by employers poses the question of need for remedial legislation

Sen. John L. McClellan, chairman of the Senate Select Committee, turned his guns on management last week. Strongly condemning employers for anti-union activity disclosed by the committee, he called for Congressional consideration of new legislation to cope with management efforts to prevent unionization, and challenged the leaders of industry to match the vigor of the AFL-CIO in dealing with those who invoke the Fifth Amendment.

The senator's criticism of employer conduct in the labor relations field followed two and a half weeks of committee investigation of management activity. Principal target was Nathan W. Schefferman, Chicago labor relations consultant whose services—often of a union busting nature—were used by a wide variety of employers "with no compunctions or regrets," according to the committee chairman.

Noting that the record reflects "great discredit" on some business firms, Senator McClellan said management must assume full responsibility for siring "the need for Nathan Schefferman." Some of the questions Congress should ask itself as a result, he declared, are these:

- Are there loopholes in the law covering management activity in union organizing drives?
- Is present law adequate to deal with employers who knowingly engage in pay-offs to prevent or discourage unionization?
- Are new laws necessary to cope with labor relations consultants such as Mr. Schefferman?

Senator McClellan stated that Mr. Schefferman's organization had enabled at least 23 clients to keep unions out of their plants or to install friendly unions. Victim of this conniving, he said, is the employee, who ends up with poor working conditions and often with a union not of his choice.

Referring to management witnesses who refused to answer committee questions, Senator McClellan said it was a "profound shock" to see American businessmen hide behind the Fifth Amendment. "It will be interesting to note," he declared, "whether business and management" will deal with these men the way the AFL-CIO has dealt with union members who have refused to testify. (The AFL-CIO does not deny the right to use the Fifth Amendment but has declared unfit for union office any member who fails to explain that his refusal to testify was for personal reasons unrelated to union corruption.)

LABOR CONSULTANT Nathan Schefferman ducks Senate questions on management activity in the labor relations field.

Meanwhile, Senator McClellan has asked AFL-CIO President George Meany for his recommendations on legislative proposals within the area investigated by the committee. Mr. Meany now is soliciting the views of all AFL-CIO union presidents. Fearful that history may repeat its tendency to allow legislators to go beyond the scope of their investigations, he has issued this warning: "I am confident there is going to be no surrender on the part of the American trade union movement to those who want to fasten anti-union legislation on the unions of the United States of America in the guise of eliminating corruption."

Labor Secretary Mitchell, at the close of the Schefferman hearing, said he would seek new curbs on anti-union activities by management and personally opposes a national right-to-work law or putting unions under the anti-trust law.

On Improper Activities

"The long-range answer to evil practices in labor-management relations is the same as the answer to all other evils in society. It lies, of course, in the hearts of men. When, in industry, these ideas are truly dominant,—that employees' welfare is of more importance than increasing profits to management, and a union member's individual rights mean much more to the union leader than his own income and power in the union,—then and only then will labor-management relations be on a truly satisfactory basis. And that this moral utopia may seem to nearly all who hear me speak of it as unreal and impractical as a midsummer night's dream, is proof that we—our society generally—is in fact indirectly responsible for the ugly practices being brought to light among us."

Boyd Leedom
Chairman
National Labor Relations Board

Refusal of Nonunion Work And Right to Jobless Pay

Does an unemployed construction worker lose his right to unemployment compensation benefits by refusing to accept the offer of a nonunion job? Arizona's Employment Security Commission says "no" but its Attorney General says "yes."

The result in one case is that the contractor who last employed the worker ends up with a higher unemployment tax; in the other case, union policies and rules are undermined and violated.

In both cases—one involving a union carpenter and the other a union laborer—the unemployed workers refused nonunion work because they felt it would violate union rules and limit their employment opportunities in the future. The commission agreed and ruled that the refusals didn't bar the right to jobless benefits.

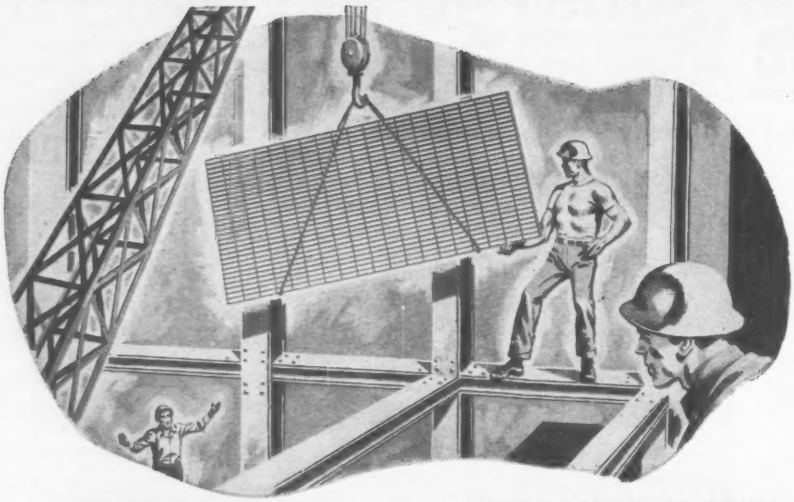
But the Attorney General, in the carpenter's case, said payment of benefits is in direct conflict with the law. In a highly qualified opinion, he listed three conditions under which benefits could not be denied:

- If the job offered is vacant because of a strike, lockout or other labor dispute.
- If the wages, hours or conditions of employment are substandard.
- If acceptance of the job would require membership in a company union or require the worker to resign from a union.

Neither case, however, clarifies the application of the state right-to-work law to such situations.

(*Labor continued on page 153*)

BUILDING?



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Court to Hear Hot Cargo Issue

Supreme Court agrees to clarify secondary boycott law as it affects union use of hot cargo clauses

Amid mounting confusion over the status of hot cargo clauses, the U. S. Supreme Court has announced that it will review a court decision that held enforcement of a hot cargo clause is not an illegal secondary boycott.

The lower court decision, handed down by the Circuit Court of Appeals for the District of Columbia, stemmed from efforts by an Oklahoma City teamster local to give effect to a contract clause in which the union reserved the right to refuse to handle freight from an employer with whom another union has a labor dispute. (In trade union parlance, goods of such an employer are "hot" and contract provisions calling for a don't touch policy have come to be known as "hot cargo" clauses.)

The Supreme Court announcement follows close on the heels of two decisions that have failed to dispel the confusion. One is a National Labor Relations Board intermediate report that the plumbers union engaged in a secondary boycott by refusing to install pipe fabricated by workers who were not members of the plumbers union, even though contractor use of such pipe was specifically prohibited by a legal contract. The other is a U. S. District Court decree that the Springfield, Mass., Building and Construction Trades Council could not justify striking against use of nonunion subcontractors on a job on the grounds that a valid master labor contract prohibited union craftsmen from working with nonunion men.

In the teamster case, which is now before the Supreme Court, the lower court had accepted the general view that execution of a hot cargo clause is not in itself illegal and does not render the labor contract that contains it invalid. The court reasoned that the clause creates a valid contractual right to refuse to do what the clause specifies and enforcement of the clause cannot logically be called illegal. Thus, existence of the clause becomes a valid defense to a secondary boycott charge. A similar approach has been taken by the Circuit Court of Appeals for the Second Circuit.

• **NLRB doctrine**—But both decisions are contrary to the views the NLRB has held for many years. The board has consistently ruled that any union attempt to induce employees to refuse to handle materials or to perform services in order to force an employer to quit doing business with another person or firm is illegal, even though the union action may be authorized by a valid contract between the union and the employer. Such action, it says, is prohibited by the secondary boycott provisions of the Taft-Hartley Act.

The NLRB position has been supported by the Circuit Courts of Appeals for the Sixth and Ninth Circuits. In both cases, the courts were dealing with carpenters refusals to install prefabricated materials made in nonunion shops—and in each case the carpenters were doing only what their labor contracts gave them the right to do.

The same problem is presented by the plumbers' case now before the NLRB. The trouble arose at Detroit Edison's River Rouge plant which is under construction by United Engineers and Constructors. In an agreement between the union and the contractor, the union reserved the right not to handle prefabricated material made in a shop that doesn't employ members of the plumbers union. Detroit Edison purchased for use on the job some pipe made by Westinghouse, whose workers don't belong to the plumbers union. Plumbers on the River Rouge plant refused to handle it.

Following the NLRB approach, the trial examiner has ruled that enforcement of the clause by appeals to employees not to handle the pipe was an illegal secondary boycott, even though the fabrication clause may be valid and enforceable by appeals to the employer.

In the Massachusetts case, a clause in a contract between Leo Spear Construction Co. and the local building trades council stated that union carpenters "are not allowed to work" with nonunion craftsmen. On a municipal job, Spear hired two nonunion subcontractors, and the union workers honored the contract clause by striking. The court said that even if the clause is a hot cargo clause—and it wasn't sure because no "unfair goods" were involved—it is no defense to a secondary boycott action, pointing out that the law prohibits union action designed to force a contractor to cease doing business with a nonunion contractor. And the court also refused to accept as a defense a clause in the Public Works Act requiring a contractor to certify he is able to hire labor that can work in harmony with all other elements of labor employed on a project. (Union position was that use of the nonunion subs was a contractor violation of the clause and justified the strike.) The court ruled the clause out as a defense because it was not intended "to legalize action unlawful under federal law."

Effective Safety Program Depends on Supervision

A well trained supervisory force is the key to an effective safety program in the construction industry, according to Arthur L. Schmuhl, assistant manager of the Accident Prevention Department of the Associated General Contractors of America, Inc.

Speaking at Cornell University Oct. 31, Mr. Schmuhl said that even a well conceived accident prevention program will fail unless the supervisory force takes the lead—and is supported by management—in coordinating safety activities.

Mr. Schmuhl appeared as a guest lecturer at Cornell's School of Industrial and Labor Relations in Ithaca, N. Y.

Emphasizing the safety promotion role of foreman, Mr. Schmuhl listed a number of steps foremen can take to reduce the accident toll. Among them were these:

- See that the proper equipment, materials and tools are supplied.
- Acquaint workers with the important steps in a given job and always stress safety measures. Keep an eye on workers assigned to new operations until it is clear they have mastered the safety techniques involved.
- Look for danger points, hazards or potential accidents.

Among the construction projects Mr. Schmuhl has worked on as safety director or engineer are the Long Sault Spillway dam at Massena, N. Y., and the Atomic Energy Commission gaseous diffusion plant in Portsmouth, Ohio.

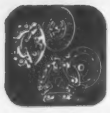
Electrical Worker Funds Used for Home Financing

The International Brotherhood of Electrical Workers, one of the 19 AFL-CIO building trades unions, has pumped between $5 and $6 million into California homebuilding this year.

Charles Foehn, business manager of IBEW Local 6 in San Francisco, last week announced that 90% of the union funds diverted to home financing has been used in the San Francisco Bay area. "The money we've invested," he said, "has been responsible for reviving new home construction in the bay area perhaps as much as 50%."

Coming from union pension funds,

ROCKFORD



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A Clutch Plate—for Every Use

ROCKFORD CLUTCHES are made with a wide variety of friction plates—to meet your specific needs exactly. Organic, metallic, segment or Morlife® cerametalic facings provide the right torque, wear and heat resistance characteristics. Cushioning arrangements minimize the effects of shock-load engagements. Dampeners blot out vibration and chatter. Pressure plates of high tensile strength resist centrifugal force of modern high speed engines. These ROCKFORD advantages will help you select the *right* friction clutch for your particular needs.

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the money has been used for VA, FHA and homebuilder loans.

Similar programs have been adopted elsewhere in the nation by other locals of the international union, the aggregate invested in home financing amounting to some $30 million.

Jurisdictional Strikes Lead to a Damage Suit

Two jurisdictional work stoppages on the Ice Harbor Dam project on the Snake River near Pasco, Wash., have led to the filing of a damage suit by the prime contractor against the carpenters union.

Montag, Halvorson, Austin & Associates of Portland, Ore., is seeking $514,000 in damages from the union, under Section 303 of the Taft-Hartley Act, contending the union is liable for financial losses caused by the stoppages. It declares that the union illegally boycotted the job and engaged in featherbedding.

A jurisdictional dispute between the carpenters and iron workers over the rigging of forms caused a partial shutdown of the project June 6-22 and a total stoppage Sept. 10-27.

Labor Department Reports Rise in Union Membership

Union membership in the United States has increased by 500,000 in the last two years, pushing the total number of workers who belong to unions to 18.5 million.

The figures, which speak as of the end of last year, are based on a survey made by the U. S. Department of Labor.

Net result, the Labor Department reports, is that 25% of U.S. workers belong to unions. If agricultural work is excluded, the percentage becomes 33⅓.

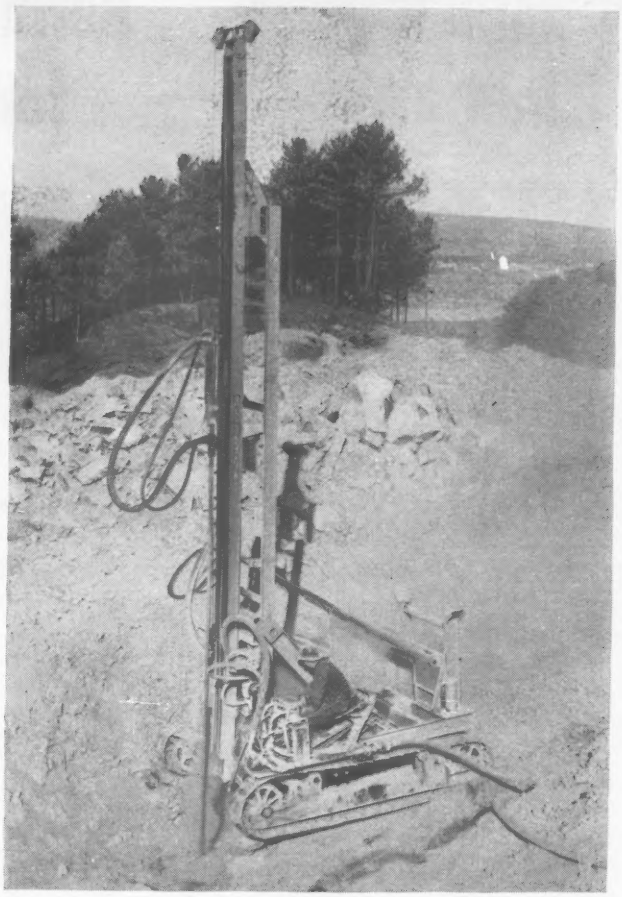
A breakdown of union membership puts 16.9 million workers in AFL-CIO unions and 1.5 million in independent unions.

Death From Overexertion Ruled to Be Compensable

Death caused by heat exhaustion suffered in the absence of a usual helper has been ruled compensable by the Pennsylvania Workmen's Compensation Board, which upheld a referee's decision that a former board had reversed. The matter reached the board a second time through a court appeal.

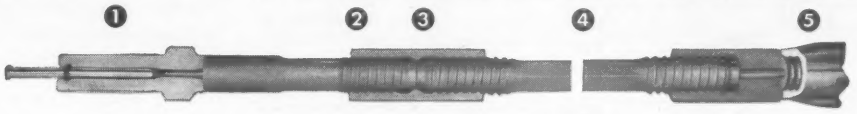
The award was granted to the widow of a driver and deliveryman for Keystone Lumber Masons & Supply Co., Philadelphia. On the day of the driver's

Going down... down... down... with a Gardner-Denver DH143



Don't settle for halfway measures when you want rock drilling depth. Move in and drill deep holes fast with the Gardner-Denver DH143. This hard-hitting rock drill has a 5½" hammer diameter . . . handles rod changes to 20' . . . delivers the heavy-duty, deep-hole punch needed in pits, quarries and open cuts. It allows you to select the proper bit and plan the proper spacing for the best breakage in any ground.

GARDNER-DENVER SECTIONAL DRILL ROD EQUIPMENT WITH RING SEAL SHANKS



Use Gardner-Denver ring seal shanks and sectional drill rods with the DH143. They are made like the highest quality rock drill parts. Special steels combined with the finest metallurgical techniques—shot peened and carburized—give this drill steel lasting deep hole drilling durability.

1. **Ring Seal Shank**—trouble-free, long-wearing "O" ring seal.
2. **Threads**—specially long for greater durability.
3. **Couplings**—designed and developed for the job.
4. **Rods**—specially treated like the finest quality rock drill parts.
5. **Carbide Bit**—holds gauge on deepest holes.

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Gardner-Denver Company, Quincy, Illinois
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Bethlehem Fasteners for Construction

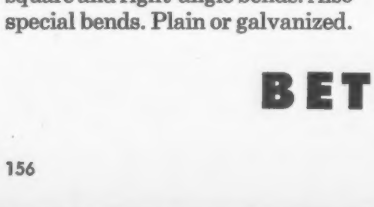
THREADED RODS—We can supply these for almost any use, in nearly any length. Straight or bent, in single or multiple units, asphaltum-dipped or hot-dip galvanized.

ROLLED THREAD—Made in thread diameters up to and including 1½ in.

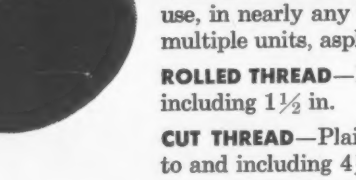
CUT THREAD—Plain or upset, in thread diameters up to and including 4½ in.

MACHINE BOLTS. Made to ASTM Specification A-307. Also available in standard grades of carbon or alloy steel. Heads are square, hex, tee, button or countersunk. Cut or rolled threads.

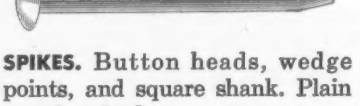
HIGH-STRENGTH STRUCTURAL BOLTS. Heat-treated to meet ASTM Specification A-325. All popular sizes in varying lengths. Supplied with hexagon head, and heavy hexagon nut.



HOOK-, U-, EYE- AND J-BOLTS. All sizes. Furnished with round, square and right-angle bends. Also special bends. Plain or galvanized.

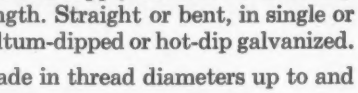


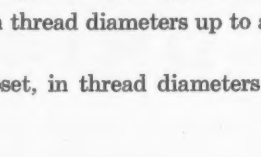
TIMBER BOLTS. Tight grip assured by four diamond-shaped lugs under head. Requires no washer, will not turn in timber. Eliminates counter-boring and retards dry rot. Square-head bridge bolt, with integral forged washer under the head, also available in varying lengths.



DRIFT BOLTS. Heads are button, square, and countersunk. Points are wedge, semi-cone, and full-cone. Also supplied without head or point. Round or square shank. Plain or galvanized.

SPIKES. Button heads, wedge points, and square shank. Plain or galvanized.





TURNBUCKLES AND CLEVISES. Available with threaded rod assemblies. Right- or left-hand threads. Furnished with or without accessories such as stub ends, pins, cotters, etc.

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BOLT SPECIALS. You name it, and we'll make it at our modern bolt and nut plant at Lebanon, Pa. Whether it's a ladder rung, a hanger pin or a special bolt—we can make a wide variety of specialties to your specifications.

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collapse, a helper did not report for work and the driver handled the delivery truck alone.

It was held by the board that "the heat of the day, working alone, handling deliveries of 100 lb bags, etc. were responsible, in our opinion, for his serious illness a few hours later, rather than merely coincidental thereto."

Work Stoppage Resulted In Jobless Benefit Loss

Union construction workers, who walked off an Air Force project to protest employment of civil service workers on construction work, have been ruled ineligible for unemployment compensation by a New York court.

The work stoppage occurred at Plattsburg Air Force Base in December 1955, when members of three building trades unions left their jobs after federal officials, as an economy move, terminated agreements with two contractors and replaced 22 union men with civil service employees. The unionists claimed it was against their policy to work with nonunion help.

When those who had left their jobs applied for unemployment compensation, the question of eligibility was raised. The law denies benefits to those who are unemployed because of an "industrial controversy."

State Industrial Commissioner Isador Lubin had disqualified the applicants because they had left their jobs without good cause and because their unemployment stemmed from an industrial dispute.

In the course of an appeal, it was ruled that no industrial controversy existed because the dispute was with the Air Force. That ruling now has been rejected and the Appellate Division has upheld Commissioner Lubin's disqualification.

"While it may be said, at least technically, that no lockout or strike existed," the court stated, "certainly an industrial controversy existed."

Prevailing Wage Law Said To Hamper Rural Projects

Public works construction in Missouri has been adversely affected by the state's prevailing wage law, according to the State Chamber of Commerce.

The Chamber's criticism of the law is directed at its administration. Principal charge is that wage scales in highly organized labor centers have been used in making wage determinations and that these have been applied to projects in rural areas. Net result, the Chamber of Commerce says, is that some communities cannot afford to undertake projects that might otherwise have been started.

The law requires that the wage scales paid by contractors on public works be at least as high as the prevailing wages for construction workers in the area. Wages are determined by the State Industrial Commission. The law became effective Aug. 29.

In support of its claim, the Chamber of Commerce asserts that the Dora, Mo., School District has not been able to construct a school because the wage determinations put the cost above what it can afford. It is contended that the wage determinations that apply were based on wage scales of metropolitan St. Louis, which is 200 miles away. Dora, a small town in a rural area, has a population of 100.

Minimum Wage of Concern To Construction Workers

Commenting on the record of the 85th Congress last month, AFL-CIO President George Meany said it "merits considerable praise as well as severe criticism."

One of the areas singled out for criticism was the failure to extend minimum wage coverage to "millions of workers still deprived of its protection." Although only a small percentage would have been in construction, the issue nevertheless directly affects the industry.

A cogent explanation comes from Robert Byron, General President of the Sheet Metal Workers International Association. He said: "Organized labor, even in the skilled trades, must realize that what concerns one great segment of workers, concerns all workers. We cannot have millions working at substandard wages without influencing the wages of the more highly paid and heavily unionized groups."

Labor Briefs . . .

• **Labor mergers**—New Hampshire and North Dakota AFL and CIO forces at the state level have completed their mergers, bringing to 32 the number of new state federations. And the AFL and CIO Central Labor Councils in St. Louis have united to form the St. Louis Labor Council, AFL-CIO.

• **Prevailing wages**—Two contractor associations in the Akron, Ohio, area have asked the Ohio State Court to compel the state's Director of Industrial Relations and its Highway Director to redetermine prevailing wages applicable to public works in three counties. A lower court had ruled the organizations lacked the beneficial interest essential to the prosecution of such a request.

OFFICIAL PROPOSALS

Bids: November 21, 1957

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time, on the 21st day of November, 1957, by Henry A. Cohen, Director, Bureau of Contracts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name
DISTRICT No. 3 WM. ROBINSON, District Engineer, 333 E. Washington Street, Syracuse, N. Y.		
Onondaga	FISH 57-18	Interstate Route 505 (Nedrow to Lafayette Sect.), FISH 56-12 (Webb Hollow Road Underpass Proj. 1-397(6)

Miles	Type	Deposit	Estimated Cost of Work
0.06 (0.39) (Acc.)	9" Cem. Conc. Pavt. 2 @ 24' = 0.06 Mi. Graded Grav. Bit. Dst = 0.39 Mi. Hy. Sep. Reinf. Conc. Rigid Frame 50.9'	$15,000 Plans $10	$267,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage) Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Laws, as set forth in "Instructions to Bidders".

The right is reserved to reject any or all bids.

JOHN W. JOHNSON
SUPT. OF PUBLIC WORKS

(Continued on the following page)

OFFICIAL PROPOSALS

RATE: The rate for Official Proposal advertising is $2.10 per line or fraction set solid. Where the advertisement is set other than solid, the space is measured by total space occupied and charged on basis of 12 lines to the inch.

CLOSING DATE: Friday 10:30 A.M. for issue dated the following Thursday.

SEND COPY TO: Official Proposal Division, Engineering News-Record, P.O. Box 12, New York 36, N. Y.

Bids: November 21, 1957.

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORK'S ALBANY, N. Y.,—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time, on the 21st day of November 1957, by Henry A. Cohen, Director, Bureau of Contracts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 4, B. F. Perry, District Engineer, Barge Canal Terminal, Rochester 1, New York						
Monroe	FASS 57-16	Thomas Avenue, Co. Rd. Project S-487(1)	1.54	Asph. Conc.=1.46 Mi. Misc. Work=0.08 Mi.	$36,000 Plans $2	$459,000
DISTRICT No. 5, E. G. H. Youngmann, District Engineer, State Office Bldg., 65 Court Street, Buffalo 2, New York						
Erie	GISP 57-1	Grand Island State Parkway: South Parkway Extension (GISP 53-1) and South Parkway (GISP 51-1)	3.19	Sidewalks, Aluminum Chain Line Fencing & Misc. Work	$6,500 Plans $2	115,000
Erie	FARC 57-174	Transit Pts. 1 & 4, SH 88 & 1334-A-1 Project U-651(A)	2.00 (0.63 Acc.)	Asph. Conc.=2.52 Mi.; Misc. Work=0.11 Mi.; Prestress, Conc. Beam Bridge 124'	$60,000 Plans $3	1,074,000
Niagara	FAC 57-15	City of Niagara Falls: Arterial Rte., Walnut Ave. & Ferry Ave. (Main St. to Pine Ave. & Packard Rd.) Project U-500(9)	4.35	Asph. Conc.=4.22 Mi.; Misc. Work=0.13 Mi.; Prestressed Conc. Bridge 76'.	$86,000 Plans $25	1,585,000
DISTRICT No. 7, Robert W. Sweet, District Engineer, 444 Van Dusee Street, Watertown, New York						
Clinton	FISH 57-23 FIC 57-21 FARC 57-175	Interstate Rte. 502, Sect. 7B-2 (Rugar St. to Cumberland Head Rd.): Plattsburg-Mooers Pt. 2, SH 259; SH 777; Tom Miller Rd. and Moffit Rd. Project I-IG-1119(10); F-576(4)	4.70 (11.94 Acc.)	Asph. Conc. Type 1A=16.60 Mi.; Misc. Work=0.04 Mi.; 4 Hy. Seps. I-Beams 181.9', 284.8', 249.2' and 246.5'	$460,000 Plans $20	8,341,000
Jefferson	FISH 57-21	Interstate Route 505 (Sect. 7AB-3) SH 183, SH 1181, CR 161, CR 95 and CR 94. Project I-1118(14)	5.51 (5.64 Acc.)	Asph. Conc. Type 1A=11.11 Mi.; Misc. Work=0.04 Mi.; 3 Hy. Seps. Comp. I Beams 122', 115.8' and 316.5'	$255,000 Plans $20	4,629,000
DISTRICT No. 10, M. E. Goul, District Engineer, 325 W. Main Street, Babylon, L. I., New York						
Suffolk	FASH 57-22	Sunrise Highway Extension (Shinnecock Canal Bridge) Project F-559(11)	0.13	Cement Conc. Pavt.=0.07 Mi.; Misc Work=0.06 Mi.; Weld. Pl. Girder Br. 374'	$45,000 Plans $3	830,000

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JOHN W. JOHNSON
SUPT. OF PUBLIC WORKS

Bids: December 3, 1957

Contract BP-160.007

THE PORT OF NEW YORK AUTHORITY
BROOKLYN-PORT AUTHORITY PIERS
NEW PIER 10

PURCHASE OF STRUCTURAL STEEL

Sealed proposals for the furnishing, fabrication, storage and delivery of structural steel for the transit shed to be erected for new Pier 10 at the Brooklyn-Port Authority Piers will be received at the office of the Chief Engineer of the Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N.Y., until 2:30 P.M. on Tuesday, December 3, 1957, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Design of the Authority, Room 1115. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, November 14, 1957

Bids: December 11, 1957

Construction of a Police, Jail and Court Building

Sealed bids will be received until 11:00 A.M., EST, on December 11, 1957, in the office of the City Manager of Fort Lauderdale, Florida, for Project F-101—Police, Jail, and Court Building. The work includes the construction of the above-named facility according to plans and specifications—approximately 44,000 square feet of building.

Bidding blanks may be obtained at the office of the City Engineer. Plans and specifications are on file in the office of the City Engineer. A deposit of $40.00 for one set of plans and specifications, and of $25.00 for each additional set of plans and specifications, will be required. All deposits for plans and specifications will be refunded upon their return in good condition within ten (10) days after the opening of bids.

Bids must be submitted in a sealed envelope, addressed to the City of Fort Lauderdale, Florida, and the name of the bidder and the project must appear upon the outside of the envelope. A certified or cashier's check for $8,000,000, made payable to the City of Fort Louderdale, shall accompany each proposal as evidence of the good faith and responsibility of the bidder. The check of the successful bidder will be retained by the City as liquidated damages, should the successful bidder fail or refuse to enter into a contract with the City for the execution of the work embraced in the proposal. Checks of unsuccessful bidders will be returned within twenty-four (24) hours after acceptance of bid by the City Commission.

The City of Fort Lauderdale reserves the right to waive any informality in any bid, and to reject any or all bids.

WILLIAM J. VEEDER, City Manager

Bids: December 3, 1957

Contract BP-160.008

THE PORT OF NEW YORK AUTHORITY
BROOKLYN-PORT AUTHORITY PIERS
NEW PIER 10

ERECTION OF STRUCTURAL STEEL

Sealed proposals for the erection of structural steel for the transit shed to be erected for new Pier 10 at the Brooklyn-Port Authority Piers will be received at the office of the Chief Engineer of the Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N.Y., until 2:30 P.M. on Tuesday, December 3, 1957, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Design of the Authority, Room 1115. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, November 14, 1957

OFFICIAL PROPOSALS

Bids: November 21, 1957

Power Authority of the State of New York

ADVERTISEMENT FOR PROPOSALS
FOR THE
CONSTRUCTION OF THE NORTH EXTENSION OF THE BARNHART-ADIRONDACK 230 KILOVOLT TRANSMISSION LINE
NEW YORK
SPECIFICATION NO. PA-8-102
CONTRACT NO. T 4

NOTICE TO CONTRACTORS: THE POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the complete installation of the North Extension of the Barnhart-Adirondack 230 kv Transmission line, until 10:30 A.M. Eastern Standard Time on the 21st day of November, 1957, at the Authority's office, 18th floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place the proposals will be publicly opened and read aloud.

The principal items of work are estimated:

675 tons steel tower structures—structural steel and accessories furnished by the Authority.
16 miles of stringing—transmission line conductors and fittings furnished by the Contractor.
8 miles of stringing—overhead ground wire and fittings furnished by the Contractor.

The work shall be completed on or before November 1, 1958.

Plans, Specifications and Proposal Forms for the work may be obtained only from the Power Authority of the State of New York, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, upon application and prepayment of a fee of ten dollars ($10.00 for initial set of Contract Documents and Five Dollars ($5.00) for each additional set. Two sets must be returned with each bid. Plans, Specifications and Proposal Forms will be on file in the Authority's office and in the office of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, for the inspection by prospective bidders.

Bids must be made in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 percent of the gross sum bid.

The right is reserved to reject any or all bids.

GENERAL MANAGER
W. S. CHAPIN

Contractors Watch

This Section—

for new projects. Publish your announcements through the proposal sections of *Engineering News-Record* and get their bids.

OFFICIAL PROPOSALS

Bids: November 21, 1957

Power Authority of the State of New York Barnhart-Plattsburgh Transmission Project

ADVERTISEMENT FOR PROPOSALS
FOR
THE FURNISHING AND DELIVERY OF 15 KV METALCLAD SWITCHGEAR
SPECIFICATION NO. PA-6-33
CONTRACT NO. TP 11

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the design, manufacture and furnishing of 15 kv Metalclad Switchgear, grounding transformer, neutral resistor, and associated equipment and services, and delivery thereof, f.o.b. cars as destination until 11:30 AM Eastern Standard Time on the 21st day of November, 1957, at the Authority's Office, 18th floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place proposals will be publicly opened and read aloud.

Bids will be received for one (1) 15 kv metalclad switchgear, grounding transformer, neutral resistor, and associated equipment and services in accordance with the bidding schedule. The switchgear will be installed by Others, but services of erecting engineers shall be provided by the manufacturer when and if required. Delivery of the switchgear, grounding transformer, neutral resistor, and associated equipment will be required July 1, 1958.

Plans, Specifications and Proposal Forms may be obtained only from the Power Authority of the State of New York, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, upon application and prepayment of a fee of Ten Dollars ($10.00) for initial set of Contract Documents and Five Dollars ($5.00) for each additional set, no part of which will be refunded. Two sets must be returned with each bid.

Plans, Specifications and Proposal Forms for the work will be on file in the Authority's Office and in the office of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, for the inspection by prospective bidders.

Bids will not be restricted to American manufacturers.

Bids must be made in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than twenty (20) percent of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN
PA-6-33 General Manager

Bids: December 19, 1957

City of Springfield, Missouri Sewage Works Improvements

DIVISION A
SOUTHWEST SEWAGE TREATMENT PLANT
ADVERTISEMENT FOR BIDS

The City of Springfield, Missouri, will receive sealed Proposals for the construction of the Southwest Sewage Treatment Plant until 10:00 A.M. Central Standard Time on the 19th day of December, 1957, at the office of the City Clerk, Springfield, Missouri.

All Proposals received will be publicly opened and read aloud in the City Council Chambers at Springfield, Missouri, beginning at 10:00 A.M. Central Standard Time, on the 19th day of December, 1957.

The Contract Documents including plans and specifications are on file and available for inspection at the office of the Director of Public Works of the City of Springfield at Springfield, Missouri, and at the office of Consoer, Townsend and Associates, Consulting Engineers, 360 East Grand Avenue, Chicago 11, Illinois.

Copies of Documents including plans and specifications required for review or bidding purposes may be obtained only from the Director of Public Works by depositing $95.00 for proposed Division A at the office of the Director of Public Works for each set of Documents so obtained.

The full amount of the deposit for one set of Documents and one-half of the deposit for any additional sets of Documents will be refunded to each bidder who submits a formal Proposal to the City of Springfield and who also returns the plans (and specifications on additional sets) in good condition to the Director of Public Works within ten (10) days after his bid security has been returned to him.

Equipment manufacturers, subcontractors, and others who do not submit formal Proposals to the City of Springfield will be refunded one-half (½) the amount of the deposit for all sets of complete Documents including plans and specifications returned in good condition to the Director of Public Works within ten (10) days after the opening of bids. No refund will be made for Documents received by the Director of Public Works after this ten (10) day period.

A certified check or bank draft drawn on a solvent bank, payable without condition to the City of Springfield, Missouri, in an amount not less than five percent (5%) of the bid, shall be submitted with each Proposal as a guarantee that if the Proposal is accepted by the City of Springfield a contract will be entered into and the performance of the contract properly secured. No bid shall be withdrawn after the opening of Proposals without the consent of the City of Springfield, Missouri, for a period of thirty (30) days after the scheduled time of closing bids. The bid securities of all bidders, except that submitted with the lowest acceptable Proposal, will be returned within twenty (20) days after the time of opening bids. The bid security submitted with the lowest acceptable Proposal may be held by the City of Springfield until a construction contract has been executed and a satisfactory Performance Bond and a satisfactory Labor and Material Bond in the sum of the full amount of his contract has been delivered to the City.

The City of Springfield reserves the right to reject any or all Proposals and to waive any informalities or irregularities in the bids received or to accept any Proposal which is deemed most favorable in the City at the time and under conditions stipulated in the Instructions to Bidders.

In general, the improvement on which Proposals are requested is briefly described as follows:

Division A—Southwest Sewage Treatment Plant

The construction on a City-owned site located approximately 2 miles southwest of the City of Springfield of a new Sewage Treatment Plant of the activated sludge type. The plant will include separate sludge digestion with sludge dewatering by open drying beds. The proposed contract includes the furnishing of all labor, materials and equipment for a complete operating installation.

Alternate Proposals are solicited on Major Items of Equipment as supplied by several manufacturers.

Plans and specifications for this Project were prepared by Consoer, Townsend and Associates, Consulting Engineers, 360 East Grand Avenue, Chicago 11, Illinois.

Any and all contracts entered into for the construction of Division A are subject to the terms of Public Law 294 concerning the payment by contractors of the prevailing schedule of wages as established by the Industrial Commission of the State of Missouri; said prevailing schedule of wages forms a part of the Documents for this Division.

CITY OF SPRINGFIELD, MISSOURI
W. B. Avery
City Manager

Dated at Springfield, Missouri
This 4th day of November, 1957

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4993) will be received at Huron, South Dakota until December 10, 1957, for furnishing labor and materials for stringing conductors and overhead groundwires Utica Junction-Sioux Falls 230-kilovolt transmission line and installing 230-kilovolt airbreak switches Utica Junction tap switching station, Transmission Division, South Dakota, Missouri River Basin Project. Location in Yankton, Turner, Lincoln, and Minnehaha counties, South Dakota. Principal items are furnishing and stringing three 954,000 circular mil ACSR conductors and two ½-inch galvanized steel overhead ground wires for 66.84 miles of line; furnishing and attaching 4,674 vibration dampers; and other work. Completion time December 20, 1958. For particulars, address Bureau of Reclamation, P. O. Box 2553, Billings, Montana; P. O. Box 325, Huron, South Dakota; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

OFFICIAL PROPOSALS

Bids: March 7, 1958

Kingdom of Thailand
Royal Irrigation Department

The Royal Irrigation Department of Thailand is prepared to receive bids for the construction and completion of Bhumiphol Dam (Yanhee Dam), Powerplant, and appurtenant structures. The work is situated on the Ping River about 65 kilometers upstream from Tak, in the northwestern part of Thailand and approximately 420 kilometers north of Bangkok by air.

The principal features of the work will be a 154 meter high concrete arch dam (containing 970,000 cubic meters of concrete), a two-tunnel spillway (11.3 meter diameter each), river outlet works, powerplant at toe of dam for two 70,000-kilowatt units (initial construction), and provisions for ultimate installation of six additional 70,000-kilowatt units, and excavation for the complete switchyard.

The project will be financed mainly by a loan from the International Bank for Reconstruction and Development.

Opening of bids. Bids shall be opened at the Royal Irrigation Department, Bangkok, Thailand, at 10 a. m., on March 7, 1958.

Bidding documents. All pertinent documents including formal invitation for bids, bid forms, schedule of annual monetary requirements, bidding schedules, specifications, and drawings will be furnished via air mail upon receipt of request to M. L. Xujati Kambhu, c/o Assistant Commissioner and Chief Engineer, United States Bureau of Reclamation, Denver Federal Center, Denver 2, Colorado, U. S. A.

Language requirement. All supervisory and key personnel sent to Thailand for work on this project must be able to read, write and speak English fluently.

Charge for specifications. Specifications will be furnished to qualified construction contractors interested in bidding by air mail upon receipt of United States ten dollars ($10); provided requests are received by December 16, 1957. For others the cost will be United States ten dollars ($10) post paid, first class.

M. L. Xujati Kambhu
Director General
Royal Irrigation Department

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4992) will be received at Albuquerque, New Mexico until December 10, 1957, for furnishing labor and materials for Channelization of the Rio Grande San Marcial Lake Area, Middle Rio Grande Project, New Mexico. Location near San Marcial, New Mexico. Principal items are 580,000 cu. yds. excavation; 67,500 cu. yds. pit run gravel; and other work. Completion time 210 days. For particulars, address Bureau of Reclamation, P.O. Box 1609, Amarillo, Texas; P.O. Box 252, Albuquerque, New Mexico; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

EMPLOYMENT OPPORTUNITIES

REPLIES (Box No.): Address to office nearest you
c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

Superintendent experienced in heavy sewer & water main construction under difficult conditions, by N. Y. State Contractor. Permanent position for qualified, responsible person looking for advancement with established firm. P-6165, Engineering News-Record.

University Career for Engineers—A number of teaching posts are open at a Canadian Engineering College in the fields of Civil, Electrical and Mechanical Engineering. The academic term extends from September 15th to May 1st and summer months are free for study, research or professional practice. Teaching loads run at 6 to 9 lectures and 3 to 9 laboratory hours, with a maximum of 15 hours per week. Salaries are open, depending on qualifications. Good pension and medical plans. Prime present requirements are in the fields of hydraulics and electronics but engineers in any of the three major fields are invited to inquire. P-6229, Engineering News-Record.

Heavy contractor, N. Y. State, needs man to assume charge of take off, purchasing, engineering, expediting. Requires sound background & responsible field experience in heavier water, sewer & treatment plant work. Excellent opportunity for qualified person seeking & able to advance. Reply to P. O. Box 147, Colvin Station, Syracuse, N. Y.

Wanted by expanding southern structural steel fabricator, experienced structural draftsman to assume duties of squad supervisor. State age, experience, education and salary requirement. Forward full information to P-6437, Engineering News-Record.

Experienced Sanitary Engineers with consult-ant. Openings for project engineer and designers. Permanent. Send resume. Cleveland, Ohio. P-6467, Engineering News-Record.

Wanted—Engineers and Draftsmen experi-enced in design and preparation of plans and/or inspection of sanitary sewers, sewage treatment works, water mains, water treatment plants. State age, education, experience, salary and when can report. P-6483, Engineering News-Record.

Superintendent, with wide experience on cof-ferdams and bridge pier construction. P. O. Box 9802—Philadelphia 40, Penna.

Sales Engineer—Preferably experienced in estimating and detailing, reinforcing steel, etc. Engineering degree desirable. Established clientele—building and highway contractors Indiana and Illinois. State experience, educational background and salary requirements. Our employees know of this advertisement. P-6523, Engineering News-Record.

Civil Engineer with concrete design experi-ence. Openings for prestressed concrete design, plant installation, plant management. Several locations. No previous experience required in prestressing. Leap Concrete, Inc., Box 1053, Lakeland, Florida.

POSITIONS VACANT

Accountant for large construction company now operating in Madison, Wisconsin area. Must be C.P.A., with construction cost systems, tax and auditing experience. Excellent position for man who can develop office systems and is ambitious. Legal experience would be helpful. All fringe benefits available. Send complete resume and references with application for interview. Salary open. Confidential. P-6521, Engineering News-Record.

Valuation & Rate Engineer. Exp. in valua-tion of water utilities, design of rate structures, depreciation studies and statistical analysis for computation of property survivor curves. Permanent position in private industry in center city Phila. Liberal benefits. Salary commensurate with exp. Submit resume and salary requirements. P-6551, Engineering News-Record.

Estimating—Design work with field experi-ence for general construction. Replies to 4545 North Keystone Ave., Indianapolis, Indiana.

Wanted—Man 35 to 55 for position as Safety and Employee Relations Supervisor with Construction Company working central U.S.A. area. Position requires man who works well with people. Give complete employment history. Martin K. Eby Construction Co., Inc., 610 N. Main, P.O. Box 1679, Wichita 5, Kansas.

Wanted: Construction Contracts Manager. Must be ambitious, aggressive man with experience in industrial construction. Not a routine "9 to 5" position. Top Salary to qualified individual, as executive in growing division of established firm with current projects in Midwest and on East Coast. P-6556, Engineering News-Record.

Superintendent: Swimming Pool construction; complete charge of field organization—able to build "Dry Pack" pools. Compensation highest. Our employees know of this ad. Write in confidence to: P-6603, Engineering News-Record.

Soils Engineer with civil degree and at least 15 years' experience to join construction supervisory staff of a large, long established company with extensive long-range expansion program. Successful applicant will supervise placement and inspection of graded material in rock fill earth core dam 300 ft. high. Preliminary work starting now and completion scheduled June 1961 with other projects in a ten-year program following. Applicant must furnish resume of experience with references relating to soils experience. Qualified applicant must pass physical exam similar to insurance exam at Company expense. Location in Southeast. Salary open. P-6607, Engineering News-Record.

Senior Cost Engineer familiar with the Uni-form System of Accounts for Electric Utilities. Duties will consist of analyzing completed major construction projects for an Electric Utility. Experience with the Federal Power Commission or a State Public Service Commission would be desirable. Some experience with the Property Record Department of any Electric Utility would also be an asset. Indianapolis Power and Light Company, Employment Department, 1230 West Morris St., Indianapolis, Indiana.

POSITION VACANT

Engineer Civil or Surveyor, experienced in field layout work; also engineer or draftsman experienced in computations, calculations and quantity estimating on construction projects. P.O. Box 402, Barre, Vt.

Estimator—General Contractor, commercial, industrial, and government construction, $100,000 and over—Washington, D. C. Only thoroughly experienced considered. Send resume of education and experience and salary required to: P-6610, Engineering News-Record.

EMPLOYMENT SERVICE

Engrs. Designers, Draftsmen, all fields Chem. Metallurgists, I.E.'s use our national coverage. Guilford Personnel Service, 502 American Bldg., Balto. 2, Md.

POSITIONS WANTED

Structural Engineer, registered graduate, 30 years subways, waterfronts, buildings, foundations, chemicals and power plants, etc., available for responsible position. PW-6405, Engineering News-Record.

General Supt. or Project Manager 25 yrs. experience: Industrial, commercial and Institutional construction. PW-6430, Engineering News-Record.

Chief Electrical Engineer—P. E.—Complet-ing foreign contract—Available soon—Wide experience design & construction power plants, air bases, industrials, refineries, POL & AE—Multilingual—Foreign only on single or family status. PW-6417, Engineering News-Record.

Struct. Design, 20 yrs. exp., wish overseas job. Will also accept field job. PW-6446, Engineering News-Record.

BCE 1950 Registered. Experience in high-ways, surveying, municipal construction, and sales. Seek job with contractor, engineer or sales. PW-6527, Engineering News-Record.

Structural Designer with 30 years rounded, experience and some field—will prepare complete plan and liaison, or serve as employee with consultant, architect or contractor. Development work or investigation on full or part time. PW-6465, Engineering News-Record.

Project Manager or General Superintendent. Age 41. 19 years experience in heavy construction domestic and foreign. From estimating to completion. Highways Airfields Pipelines Disposal-plants. Prefer southeastern states—would consider other. Presently employed. Available Oct. 21. PW-6487, Engineering News-Record.

Project Manager or General Superintendent 13 yrs. supervisory exp. ind., comm. and res. const. Eng. background, B.A. deg. will relocate Southwest and Calif. Excellent ref. PW-6534, Engineering News-Record.

Structural Engineer 25 yrs. experience de-sign bridges, buildings, sewage treatment, water filtration plants, 10 yrs. prestressed concrete design. PW-6548, Engineering News-Record.

Construction Supt. General construction. PW-6317, Engineering News-Record.

(Continued on opposite page)

EMPLOYMENT OPPORTUNITIES

DISPLAYED

The advertising rate is $31.80 per inch for all advertising appearing on other than a contract basis. Frequency rates quoted on request.

An advertising inch is measured 7/8" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

—RATES—

UNDISPLAYED

$2.10 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.
Position Wanted ads take ½ of above rate.
Box Numbers—count as 1 line.
Discount of 10% if full payment is made in advance for 4 consecutive insertions.
Not subject to Agency Commission.

Send NEW ADS and Inquiries to Classified Advertising Division of ENGINEERING NEWS-RECORD
P. O. Box 12, N. Y. 36. November 28th issue closes November 15th

JOB OPPORTUNITY

EXPERIENCED EARTH MOVING EQUIPMENT SERVICE MANAGER.
UNDER 38 YEARS OF AGE.
MUST BE ABLE TO HANDLE SERVICE MANAGEMENT PROBLEMS OF LARGE SCALE OPERATION.
ONE OF WORLD'S LARGEST HEAVY EARTH MOVING EQUIPMENT DEALERS, IDEALLY LOCATED IN WORLD'S FINEST CLIMATE.
COMPANY BENEFITS AND PROFIT SHARING PLAN.—SALARY OPEN.

SEND QUALIFICATIONS AND PHOTO TO

P-6083 Engineering News-Record, 1125 W. 6th St., Los Angeles, Calif.

CIVIL ENGINEERS

Civil Engineers with experience in hydraulics, concrete, soils or specifications for design hydraulic structures in Harrisburg, Pennsylvania. Graduate Civil Engineers also required for Chief, Construction Branch and Resident Engineers on Dam Construction. Salary open. State experience, salary requirements and references.

P-6428, Engineering News-Record
Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

POSITIONS WANTED
(Continued from opposite page)

Electrical Engineer: Over thirty years experience covering all phases of electrical and mechanical construction and operation. Design certain fields. Married, no children, excellent health, free to travel. Employed. Available December 1. PW-6425, Engineering News-Record.

Estimator-General Construction BSCE, 33, Registered. 10 years experience in estimating, design and construction. 6 years estimating includes buildings, industrial (paper, cement, steel, glass) and utility plants (boiler, sewage, water). Have held responsible positions including present. Desire to relocate in southeast. Anything considered. Prefer small, progressive Florida general contractor. Available 30 days. Rush. All replies acknowledged with detailed resume. PW-6559, Engineering News-Record.

Civil Engineer, 29, BSCE, MSCE, varied experience. Desires position in structural design. Resume upon request. PW-6565, Engineering News-Record.

Chief Structural Engineer, MASCE, BS, New York license. Thirty years in design and construction. Proven administrative and technical ability. Fully qualified to supervise design of industrial buildings, bridges and other structures. Will consider association with architect, available immediately. PW-6228, Engineering News-Record.

Master Mechanic—Plant Engineer, Supt. of Maintenance, 15 years experience all types heavy equipment, erection and operation of sand & gravel, crushing, and asphalt plants, asphalt paving. Seeking permanent position with reliable co. or my experience for an interest. PW-6600, Engineering News-Record.

Field Eng., Chief of Party or Draftsman, graduate of 2 yr. Tech college in Highway & Municipal Eng. Young, married, both field & office experience. Desires foreign employment. Available immediately. PW-6598, Engineering News-Record.

General Superintendent, 27 yrs. experience in all phases of Earth Moving Construction projects, especially Heavy Rock Work. Engineering background, Estimating experience, have large following competent skilled men. Available at once, will locate anywhere. PW-6611, Engineering News-Record.

CONSTR. SUPT.

American mining corporation in Jamaica doubling its capacity requires capable, young civil engineer to supervise construction of small buildings, roads, tramways, and installation of equipment. Prefer previous foreign engineering and supervisory experience and interest in indefinite stay Write immediately giving age, education, and experience.

P-6496, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

CHIEF, DIVISION OF GENERAL PUBLIC WORKS OPERATIONS: Graduate Civil Engineer, age 30-50, for responsible, professional and administrative work involving street maintenance, building and grounds maintenance, garbage collection, etc.

DESIGN ENGINEERS: Graduate Civil Engineer to do detailed design work involving street paving, storm sewer and sanitary sewer projects. Must be capable of supervising subordinates involved in such activities.

Application should be made, giving minimum salary, to Department of Personnel, Springfield, Missouri.

ELECTRICAL ENGINEER

Electrical Engineer, preferably with hydroelectric plant background, to be responsible for all electrical installations in large hydroelectric plant located in the Pacific Northwest. State education, chronological experience and salary record, salary expected, reference and when available.

P-6583, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

STRUCTURAL
ENGINEERS
DESIGNERS
DRAFTSMEN

Prefer several years or more experience in any of these fields:

BRIDGES

BUILDINGS
EXPRESSWAYS
HYDRO PROJECTS
TEST FACILITIES*

Will consider lesser experience with good educational background, including several recent graduates to round out a planned expansion program. Occasional openings for combination field men. These are permanent additions to our regular staffs.

We are professional engineers engaged primarily in design which covers a wide scope of practice. The variety and unusual character—for example, the proposed world's largest bridge project—offer excellent opportunity for professional development and advancement.

Immediate openings in our St. Louis general offices and occasionally in our San Francisco branch office. Confidential interviews can also be obtained at Washington, D.C., and Portland, Oregon.

Paid vacation, sick leave, holiday, overtime. Excellent Employee Benefits Plan provides retirement income plus life and disability insurance. Blue Cross. Moving allowance.

Please write fully, including salary data, to

SVERDRUP & PARCEL, Inc.
ENGINEERS — ARCHITECTS
915 Olive St. Louis 1, Mo.

***We are designers of the technical facilities for the Arnold Engineering Development Center, operated by our subsidiary, ARO, Inc.**

CIVIL ENGINEERS

Positions in California State Government in a variety of locations throughout the State for recent college graduates.

HIGHWAY

Office and field work in California's dynamic highway program.

BRIDGE

Design and field work in California's multimillion dollar bridge program.

SANITARY

Engineering control of water supply and waste disposal, air pollution and industrial hygiene.

No experience required for Junior position.

Junior positions
$481 to $530 a mo.

Positions open at this level only.
U. S. citizenship required.

Write for illustrated booklet:

C. S. Warner, Supervisor, Section E
801 Capitol Avenue
Sacramento 14, Calif.

WANTED
Technical Editor Applicants

Editorial staff positions are available from time to time on Construction Methods. Your application will be welcome now for consideration when additions are made.

YOU SHOULD HAVE

- Some practical field construction experience
- Familiarity with construction machinery and materials
- A civil engineering education background
- An enthusiasm for new developments
- A sympathetic interest in people and their ideas
- The ability to write easily and well
- A desire to make a career in technical journalism

Please send details of your background and experience (including salary requirements) to

The Editor
Construction Methods and Equipment
330 W. 42nd St.
New York 36, N. Y.

ENGINEERS DESIGNERS

McKee has permanent openings at their Cleveland, Ohio, offices for men with at least 3 years' experience in any of the following:

Oil Refineries
Blast Furnaces
Steel Mills
Industrial Plants

In the following categories:

Piping Checkers
Process Piping
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Concrete
Structural
Electrical
Mechanical
Pressure Vessel
Mechanical Equipment
Specifications
Instrumentation
Estimators

Broad diversification of work in our 3 engineering divisions assures you security of employment.

Send detailed resume to
G. VICTOR HOPKINS

ARTHUR G. McKEE & Co.
2300 Chester Ave., Cleveland 1, Ohio

WANTED—GENERAL MANAGER
To operate municipal water dist.

4000 customers in rapidly growing California community near S. F. Civil Engineering background and administrative experience desired.
Salary open, commensurate with qualifications.

NORTH MARIN WATER DISTRICT
VALLEJO ST. NOVATO, CALIF

Highway Engineers - Designers & Draftsmen
Bridge Engineers - Designers & Draftsmen
Architectural - Designers & Draftsmen

Permanent employment for qualified men. Ample opportunity for advancement based on merit; plus excellent retirement program, group life insurance, hospitalization, paid vacations and holidays. Salary commensurate with experience.
Architectural openings in Rochester, Pa. Highway & Bridge openings in Pennsylvania, Maryland, Mississippi, Ohio & West Virginia.

Air Mail Resume To: R. L. SHAW, *Personnel Director*

MICHAEL BAKER, Jr., INC. Baker Bldg. Rochester, Pa.

STRUCTURAL DESIGN ENGINEER

Established engineering-construction firm with Chicago and New York offices. This position in Chicago office. Experience with steam-electric and industrial structures and foundations necessary. Excellent opportunity to become part of expanding progressive company. Send confidential resume.

P-6593—Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

SALES ENGINEERS

A major steel company has need for sales engineers to promote and sell fabricated products in middle Atlantic states. Excellent opportunities for men 25 to 30 years old with engineering background and a desire for sales work. Attractive starting salary with company car, expenses and bonus plan.

SW-4684, Engineering News-Record,
Class. Adv. Div., P.O. Box 12, N. Y. 36, N. Y.

ESTIMATOR & CIVIL ENGINEER

Experienced in Cofferdam & Form Design, Bridge, Highway and All Types of Heavy Construction. Salary Open. Send Resume and Salary Requirements.

OLE HANSEN & SONS, INC.
Box 553, Pleasantville, New Jersey

WANTED . . . ASSISTANT ENGINEER

Graduate civil engineer. Starting pay $5300 to $5600, depending on experience. Liberal insurance, pension plan, stock purchase and training benefits.

Give description, academic record and references when applying.

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NOTICE to ADVERTISERS

Because of the Holiday, Thanksgiving Day, November 28th, the "Searchlight" pages of the

November 28th Issue of
ENGINEERING
NEWS-RECORD

Close for press earlier than the usual weekly closing time.

The cooperation of advertisers is solicited in forwarding new copy, or changes of copy, to reach us accordingly.

Display and Undisplayed Ads
FINAL CLOSING TIME
Friday, November 15th

PROPOSALS
Wednesday, November 21st

SEARCHLIGHT SECTION

(Classified Advertising)

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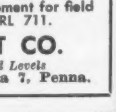

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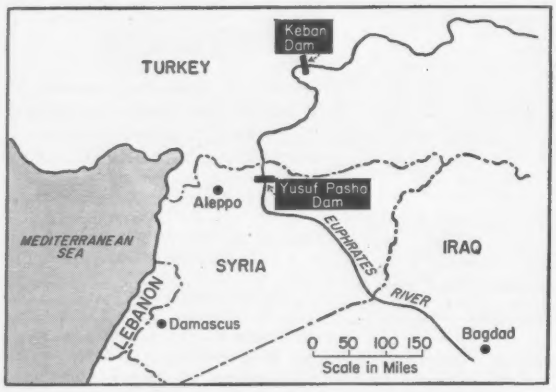
The Plot Thickens

When Syria's Parliament, last week, unanimously approved the already-signed "economic and technical agreement" with Russia, the seed for a whole new series of Middle East crises was planted. Moreover, since Russian aid, up to perhaps a half-billion dollars, is promised for a long list of public works projects, it is civil engineering and construction controversies that will nurture the coming crisis crop.

One of these projects, particularly, illustrates how engineering considerations can fan the flames of international ill will. This is Syria's proposed Yusuf Pasha Dam on the Euphrates River. As shown on the accompanying map, this dam is just below the Turkish border, while not many miles upstream is the site of Turkey's proposed Keban Dam. Dams on the same stream either side of an international border create problems even between friendly nations, as on our Columbia River for example. As between unfriendly nations, dams dependent upon the same water supply can turn the problems into dangerous controversies.

Turkey's Keban Dam, already well into the design stage, will be a concrete gravity structure 490 ft high to store water for a 1 million kw power installation. There are also three other good sites for power dams on the



Euphrates in Turkey below Keban. How these power projects are designed and operated could have a significant effect on Yusuf Pasha's water supply. So some future Turkish-Syrian border question could well revolve around water instead of troop concentrations.

More immediate possibilities for stirring up discord are also present in the Russian-Syrian agreement. With Russian engineers and construction specialists prominently identified with projects in Syria, and their U. S. counterparts actively engaged in all of the surrounding countries, the stage will be set for a new phase of the propaganda war. Who can build the best and the fastest? Who is most friendly to the Arabs? Isn't this or that new road being built more for war than for economic benefits?

Thus, a whole new series of controversies can be added to the present one over Russian shipment of arms to Syria. In this way this Russian-Syrian agreement to cooperate in the construction field may well turn out to be a serious embarrassment to the U. S. in its attempts to evolve a workable Middle East policy for restoring stability to this troubled area.

Time was when this Russian penetration into Syria could probably have been forestalled by a more liberal U. S. foreign aid policy. Now, however, unless Russia fails to implement its agreement, that time is past. Our best future strategy is to do a better development job in the other Middle East countries than Russia can do in Syria. This will not head off the propaganda, but it will retain our friends—and make it possible for the West rather than Russia to benefit from the Middle East oil supplies. Otherwise, Russia could quickly bring all Europe under her control, with dire consequences to the freedom and security of the whole western world.

Upgrading Civil Engineering

Recruitment of students into civil engineering today, in sufficient number and grade to assure a strong construction industry managed by capable professionals tomorrow, is a top priority problem.

One requirement, without question, is improvement of the relative financial picture for civil engineers. This is certainly not a simple task, and it is made all the more complex by the civil service aspect, so strong within this engineering branch. Yet, the pay problem is not so formidable as to defy tackling. In fact, it might best be tackled on the civil service side first, if that is the area in greatest need of financial upgrading.

A second basic need, if good students are to be recruited into civil engineering, is for improvement in the public opinion of civil engineering. For that matter, civil engineer opinion of civil engineers, which was found at a pretty low ebb in a recent ASCE poll of its members, could also stand some upgrading. The big, overall job to be done is actually one of public relations: Civil engineering needs to gain better public appreciation for its good performance by properly communicating with the public; and the profession needs to gain a better appreciation of itself—of the importance, scale, and even the romance of the work that it does.

We also need more civil engineering enthusiasts in the all-important student guidance work in high schools. It is time to stop playing down the interest, the fascinations, the excitement, the adventure of construction. In this regard, we commend the article on Quebec's dramatic Chutes-des-Passes project in this issue (see cover). It evidences the kind of enthusiasm we mean—plus the fact that there is reason for such enthusiasm as a first prerequisite in the attraction of good students to civil engineering.